76 B pn 1

FINAL

U.S. Army Environmental Center

Remedial Action Plan for Indoor Surfaces at Army Materials Technology Laboratory

Volume 1

Task Order 1

Contract Number DAAA15-90-D-0009

January 1996

19960301 072

DISTRIBUTION STATEMENT A

Approved for public release; Distribution Unlimited

Prepared by:

DTIC QUALITY INSPECTED 1

Prepared for:

U.S. Army Environmental Center
Aberdeen Proving Ground
Maryland 21010-5401

WESTON MANAGERS DESIGNERS/CONSULTANTS

Roy F. Weston, Inc.
West Chester,
Pennsylvania 19380-1499

AEC Form 45, 1 Feb 93 replaces THAMA Form 45 which is obsolete.
95P-5122

FINAL

REMEDIAL ACTION PLAN FOR INDOOR SURFACES AT ARMY MATERIALS TECHNOLOGY LABORATORY WATERTOWN, MASSACHUSETTS

VOLUME I

Task Order 1

Contract No. DAAA15-90-D-0009

January 1996

Prepared by:

Roy F. Weston, Inc.
Weston Way
West Chester, Pennsylvania 19380

Work Order No. 02281-011-001-0080

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)

2. REPORT DATE
January 1996

3. REPORT TYPE AND DATES COVERED
Final, 1990 - January 1996

4. TITLE AND SUBTITLE

Remedial Action Plan for Indoor Surfaces at Army Materials Technology Laboratory

5. FUNDING NUMBERS

DAAA15-90-D-0009

6. AUTHOR(S)

R. Shimko B. Hoskins
L. Bove

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Roy F. Weston, Inc.
One Weston Way
West Chester, PA 19380

8. PERFORMING ORGANIZATION REPORT NUMBER

02281-011-001-0100

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Environmental Center
Building E-4480, CETHA-BC
Aberdeen Proving Ground, MD 21010-5401

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

Unlimited

13. ABSTRACT (Maximum 200 words)
This report is one of three reports that address technologies and remedial action alternatives that may be applied to the U.S. Army Materials Technology Laboratory (MTL) in Watertown, Massachusetts. This report discusses indoor surfaces and containers, a second report discusses outdoor areas. The third report discusses surface water and sediments. A variety of remedial technologies were identified, and several of them were evaluated in detail. The evaluation was performed in accordance with the Massachusetts Contingency Plan (310 CMR 40). The selected remedial alternative is a combination of dismantling components that cannot be easily cleaned (such as lab hoods) and decontamination by means such as vacuuming, washing, and grit blasting. Part of this report was the development of cleanup goals for wipe samples of interior surfaces.

14. SUBJECT TERMS

Building interiors, cleanup goals, Material Technology Laboratory, Massachusetts Contingency Plan, remediation

15. NUMBER OF PAGES
— Text
— Appendices

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI Sta Z39-18
Z98-102

Massachusetts Department of Environmental Protection

Bureau of Waste Site Cleanup

BWSC-108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number: 3 - 0455

A. SITE LOCATION:

Site Name: (optional) Army Materials Technology Laboratory

Street: 395 Arsenal Street   Location Aid: ____

City/Town: Watertown   ZIP Code: 02172

Related Release Tracking Numbers that this Form Addresses: ____

Tier Classification: (check one of the following) [X] Tier IA [ ] Tier IB [ ] Tier IC [ ] Tier II [ ] Not Tier Classified

If a Tier I Permit has been issued, state the Permit Number: ____

B. THIS FORM IS BEING USED TO: (check all that apply)

- [ ] Submit a **Phase I Completion Statement**, pursuant to 310 CMR 40.0484 (complete Sections A, B, C, G, H, I and J).
- [ ] Submit a **Phase II Scope of Work**, pursuant to 310 CMR 40.0834 (complete Sections A, B, C, G, H, I and J).
- [ ] Submit a final **Phase II Comprehensive Site Report and Completion Statement**, pursuant to 310 CMR 40.0836 (complete Sections A, B, C, D, G, H, I and J).
- [X] Submit a **Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862 (complete Sections A, B, C, G, H, I and J).
- [ ] Submit a **Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874 (complete Sections A, B, C, G, H, I and J).
- [ ] Submit an **As-Built Construction Report**, pursuant to 310 CMR 40.0875 (complete Sections A, B, C, G, H, I and J).
- [ ] Submit a **Phase IV Final Inspection Report and Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879 (complete Sections A, B, C, E, G, H, I and J).
- [ ] Submit a periodic **Phase V Inspection & Monitoring Report**, pursuant to 310 CMR 40.0892 (complete Sections A, B, C, G, H, I and J).
- [ ] Submit a final **Phase V Inspection & Monitoring Report and Completion Statement**, pursuant to 310 CMR 40.0893 (complete Sections A, B, C, F, G, H, I and J).

You must attach all supporting documentation required for each use of form indicated, including copies of any Legal Notices and Notices to Public Officials required by 310 CMR 40.1400.

C. RESPONSE ACTIONS:

- [ ] Check here if any response action(s) that serves as the basis for the Phase submittal(s) involves the use of Innovative Technologies. (DEP is interested in using this information to create an Innovative Technologies Clearinghouse.)

Describe Technologies: ____

D. PHASE II COMPLETION STATEMENT:

Specify the outcome of the Phase II Comprehensive Site Assessment:

- [ ] Additional Comprehensive Response Actions are necessary at this Site, based on the results of the Phase II Comprehensive Site Assessment.
- [ ] The requirements of a Class A Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.
- [ ] The requirements of a Class B Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.
- [ ] Rescoring of this Site using the Numerical Ranking System is necessary, based on the results of the final Phase II Report.

E. PHASE IV COMPLETION STATEMENT:

Specify the outcome of Phase IV activities:

- [ ] Phase V operation, maintenance or monitoring of the Comprehensive Response Action is necessary to achieve a Response Action Outcome. (This site will be subject to a Phase V Operation, Maintenance and Monitoring Annual Compliance Fee.)
- [ ] The requirements of a Class A Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.
- [ ] The requirements of a Class C Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

SECTION E IS CONTINUED ON THE NEXT PAGE

E. PHASE IV COMPLETION STATEMENT: (continued)

☐ The requirements of a Class C Response Action Outcome have been met. Further operation, maintenance or monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Indicate whether the operation and maintenance will be Active or Passive. (Active Operation and Maintenance is defined at 310 CMR 40.0006.):

○ Active Operation and Maintenance ○ Passive Operation and Maintenance

(Active Operation and Maintenance makes the Site subject to a Post-RAO Class C Active Operation and Maintenance Annual Compliance Fee.)

F. PHASE V COMPLETION STATEMENT:

Specify the outcome of Phase V activities:

☐ The requirements of a Class A Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ The requirements of a Class C Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ The requirements of a Class C Response Action Outcome have been met. Further operation, maintenance or monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Indicate whether the operation and maintenance will be Active or Passive. (Active Operation and Maintenance is defined at 310 CMR 40.0006.):

○ Active Operation and Maintenance ○ Passive Operation and Maintenance

(Active Operation and Maintenance makes the Site subject to a Post-RAO Class C Active Operation and Maintenance Annual Compliance Fee.)

G. LSP OPINION:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with the information contained in this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

> *if Section B indicates that a* ***Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that a* ***Phase II Scope of Work*** *or a* ***Phase IV Remedy Implementation Plan*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that an* ***As-Built Construction Report*** *or a* ***Phase V Inspection and Monitoring Report*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

☐ Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

LSP Name: Bruce A. Hoskins LSP #: 7109 Stamp:

Telephone: (508) 988-7000 Ext.:

FAX: (optional) (508) 988-7093

Signature: Bruce A Hoskins

Date: 1/5/96

COMMONWEALTH OF MASSACHUSETTS
BRUCE A. HOSKINS
No. 7109
REGISTERED
LICENSED SITE PROFESSIONAL

Massachusetts Department of Environmental Protection **BWSC-108**
Bureau of Waste Site Cleanup

DEP

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number: 3 - 0455

H. PERSON UNDERTAKING RESPONSE ACTION(S):

Name of Organization: Army Materials Technology Laboratory

Name of Contact: Robert Chase Title: BRAC Environmental Coordinator

Street: 395 Arsenal Street

City/Town: Watertown State: MA ZIP Code: 02172-2700

Telephone: (617) 753-3806 Ext.: ______ FAX: (optional) 617/753-3813

☐ Check here if there has been a change in the person undertaking the Response Action.

I. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTION(S): (check one)

☒ RP or PRP Specify: ◯ Owner ⊗ Operator ◯ Generator ◯ Transporter Other RP or PRP: ______

☐ Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ Any Other Person Undertaking Response Action Specify Relationship: ______

J. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTION(S):

I, Robert Chase, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/~~the person~~ or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

By: Robert E Chase Title: BRAC Environmental Coordinator
(signature)

For: Robert E Chase Date: 12/27/95
(print name of person or entity recorded in Section H)

Enter address of the person providing certification, if different from address recorded in Section H:

Street: ______

City/Town: ______ State: ______ ZIP Code: ______

Telephone: ______ Ext.: ______ FAX: (optional) ______

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

The use of trade names in this report does not constitute an official endorsement or approval of the use of such commercial products. The report may not be cited for purposes of advertisement.

Printed on Recycled Paper

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

LIST OF TABLES
(Continued)

LIST OF TABLES
(Continued)

LIST OF FIGURES

LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AEC	Army Environmental Center
AMMRC	Army Materials and Mechanics Research Center
ARARs	Applicable or Relevant and Appropriate Requirements
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineering, Inc.
BNA	Base/Neutral/Acid Extractable Organic Compounds
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DU	Depleted Uranium
EPA	Environmental Protection Agency
GSA	General Services Administration
MADEP	Massachusetts Department of Environmental Protection
MSL	Mean Sea Level
MTL	Materials Technology Laboratory
MWRA	Massachusetts Water Resources Authority
NAAQS	National Ambient Air Quality Standards
NCP	National Contingency Plan
NIOSH	National Institute for Occupational Safety and Health
NJDEPE	New Jersey Department of Environmental Protection and Energy
NRC	Nuclear Regulatory Commission
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration

LIST OF ACRONYMS
(Continued)

PA/SI	Preliminary Assessment/Site Inspection
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Level
POTW	Publicly-Owned Treatment Works
QA	Quality Assurance
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Level
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
TBC	To Be Considered
THAMA	Toxic and Hazardous Materials Agency
TLV	Threshold Limit Value
USACE	U.S. Army Corps of Engineers
WESTON	Roy F. Weston, Inc.
WHO	World Health Organization

EXECUTIVE SUMMARY

This report is one of three reports that address technologies and remedial action alternatives that may be applied to the U.S. Army Materials Technology Laboratory (MTL) in Watertown, Massachusetts. This report discusses the indoor areas and buildings, including indoor containers. A second report discusses on-site outdoor areas (soil and groundwater). A third report (yet to be completed) will address the Charles River surface water and sediments. This report was prepared by Roy F. Weston, Inc. (WESTON®) for the U.S. Army Environmental Center (AEC) [formerly Toxic and Hazardous Materials Agency (THAMA)] under the Base Closure Program Contract (DAAA15-90-D-0009, Task Order 1 and its associated modifications).

This report has been prepared to identify and screen a variety of remedial technologies that may be feasible for addressing potential risks to the public and the environment posed by contamination in buildings and indoor containers. From these technologies, several remedial alternatives were developed, screened, and evaluated in detail. The technologies were evaluated in accordance with the Massachusetts Contingency Plan (310 CMR 40). This report is written to meet the requirements of a Remedial Action Plan (RAP) as detailed in 310 CMR 40.0861.

History of Site Investigation

Since 1979, numerous investigations have been conducted at the site. These include:

- 1979 - Department of the Army, U.S. Environmental Hygiene Agency - Incompatible chemicals stored in Building 241. Accidental spillage of beryllium in machining area.
- 1980 - USATHAMA - Records search identified depleted uranium, beryllium, metals, and organics as major potential site contaminants.

- 1981 - U.S. Army Environmental Hygiene Agency - Air emission sources investigated were found to be in compliance with air pollution emission standards.

- 1990 - EG&G - Environmental Investigation Status Report presented the results of the 1988 field effort.

- 1991 - WESTON - Phase 1 Remedial Investigation.

- 1992 - WESTON - Phase 2 Remedial Investigation.

- 1995 - WESTON - Human Health Evaluation of Exposures to Indoor Building Surfaces.

The Phase 2 RI results provided a detailed characterization of the contamination of the indoor areas at MTL.

Findings of the Phase 2 Remedial Investigation (Indoor Areas)

An extensive surface wipe and air sampling program for chemical contaminants was conducted during the Phase 2 RI. In general, composite wipes were taken on the walls and floors for all of the designated sample areas and additional wipes were taken where fume hoods, floor drains, exhaust vents, and accessible I-beams existed. Based on the data gathered in the RI, it was determined that remedial actions are not required for cisterns and sumps. Remedial action is required to address contamination on building surfaces and materials.

A risk assessment was conducted to evaluate the potential for risks to future human populations. Two possible future reuse scenarios, commercial and residential, were considered. This risk assessment determined that the risk-based limits established in accordance with the Massachusetts Contingency Plan (MCP) were exceeded. Remediation cleanup goals were established for each compound such that the MCP goals for cancer risk and noncancer health effects would be met. Cleanup goals were established for both residential and commercial reuse.

Because many of the compounds are naturally occurring or are ubiquitous because of human activity, the cleanup goals were compared with background concentrations for each compound. On-site living quarters were used for the residential background and off-site commercial facilities were used for the commercial background.

A compilation of sitewide building rooms and areas requiring remedial action for both residential and commercial reuse was prepared based on the comparison of surface wipes to the established cleanup standards. General building surfaces consisted of walls, floors, floor drains, and I-beams. The surface types requiring remediation included concrete, brick, concrete block, floor tile, dry wall, wood paneling, and metal.

Remedial Action Objectives

The remedial action objectives for indoor areas at MTL are as follows:

- Prevent direct contact with structures or dust and debris exhibiting contamination at levels that pose unacceptable carcinogenic or noncarcinogenic health risks or are in excess of cleanup standards.

- Prevent migration of contamination from indoor areas to other areas at MTL or to off-site areas.

Identification and Screening of Remedial Action Technologies

Based on the RI results and remedial action objectives, several general response actions and remedial action technologies and process options were identified as potentially applicable to indoor areas at MTL. These technologies and process options were then screened according to the following criteria:

- Site characteristics
- Substance characteristics
- Technology limitations
- Technology implementation

These criteria were used to determine if a technology or process option was to be retained or eliminated from further consideration. During this evaluation, technologies or process options were eliminated if they could not be feasibly implemented, if they did not apply to the site-specific contaminants, or if they could not treat or remove the site contaminant to the desired cleanup goals. The following technologies were retained after screening for use in evaluating and selecting remedial action alternatives:

- No action
- Install fences and place signs to restrict access
- Deed restrictions
- Air monitoring
- Building demolition
- Dismantling and removal of building particulars
- Encapsulation
- Steam cleaning
- Grit blasting
- Strippable coatings
- Fixative/stabilizer coatings
- Dusting/vacuuming/wiping
- Hydroblasting/water washing
- Scarification
- Drilling and spalling
- Solvent washing
- Acid or alkali etching
- Bleaching

Technology process options that were evaluated and eliminated during this screening step included:

- Flaming
- Vapor phase solvent extraction
- Fluorocarbon extraction
- Photochemical degradation
- Microbial degradation

Development and Screening of Remedial Action Alternatives

Five remedial action alternatives were developed based upon site-specific conditions and the technology process options retained from the screening process. These alternatives mitigate the potential public health risks associated with site constituents to varying degrees. Some alternatives would treat or remove contaminants to levels that meet acceptable public risk. Other alternatives would not treat or remove contaminants to meet acceptable risk levels, but were used for comparison with the other alternatives. The remedial action alternatives developed for the MTL indoor areas were:

- B1 - No Action
- B2 - Institutional Actions
- B3 - Demolition of Indoor Areas
- B4 - Decontamination of Indoor Areas
- B5 - Decontamination/Dismantling of Indoor Areas

These remedial alternatives were screened on the basis of their effectiveness, implementability, and cost. During this screening, Alternative B3 was rejected because demolition is in conflict with the historical preservation of the MTL buildings. Also, certain decontamination process options applicable to Alternatives B4 and B5 were rejected. The rejected options were:

- Encapsulation
- Strippable coatings
- Fixative/stabilizer coatings
- Drilling and spalling
- Bleaching

These process options were rejected for specific reasons although each option is technically implementable. Encapsulation and fixative/stabilizer coatings were rejected because the contaminants remain in place and could eventually break through the protective coating layers. Strippable coatings were rejected because it is a difficult option to implement and provides no additional advantages over other more easily implemented options. Drilling and spalling was rejected because it is only applicable to deep subsurface contamination which

is not expected to be present. Bleaching was rejected because it is primarily applicable for the cleanup of large pesticide spills which has not happened at MTL.

The remaining four alternatives were subjected to detailed analysis.

Detailed Analysis of Remedial Action Alternatives

Each of the four retained alternatives was analyzed by the following criteria:

- Effectiveness
- Reliability
- Implementability
- Risk
- Benefits
- Timeliness
- Nonpecuniary interests
- Cost

Each alternative was summarized and compared on the basis of cost and noncost criteria. Implementation costs were estimated for each remedial alternative. Alternatives B4 and B5 have no associated costs after remediation is completed. Alternatives B1 and B2 have long-term monitoring costs. For Alternatives B4 and B5, the costs were evaluated for three possible reuse scenarios:

- Scenario 1 - Commercial reuse for Zones 1, 2, and 3, public access for Zone 4 and River Park.
- Scenario 2 - Residential reuse for Zones 1, 2, and 3, public access for Zone 4 and River Park.
- Scenario 3 - Commercial reuse for Zones 1 and 2, residential reuse for Zone 3, and public access for Zone 4 and River Park.

The four zones at MTL are defined by the Watertown Arsenal Reuse Committee and are discussed in Subsection 3.2.

To equally compare the costs of each alternative, a present value analysis was performed on the implementation costs of each alternative. In the analysis, the future costs of the alternative were converted to 1995 dollars. Table ES-1 summarizes the primary components and estimated present value costs for each alternative.

Selection of Alternative

Alternative B5 (Decontamination/Dismantling of Indoor Areas) has been selected as the alternative for implementation at this site. This alternative is a permanent solution and will reduce contamination levels to a no significant risk level. It was selected over Alternative B4 because it allows for the flexibility of selecting either decontamination or removal of contaminated surfaces.

Plan for Remediation

The remediation of building interiors at MTL will be conducted in the following steps:

- Pre-remediation testing to confirm areas to be remediated and conduct pilot study.

- Remedial design and preparation of Remedial Implementation Plan.

- Remedial action.

- Post-remediation activities including confirmatory sampling.

The remedial activities are scheduled to be completed by the end of 1997.

Table ES-1

Summary of Remedial Action Alternatives

Alternative	Alternative Name	Description	Present Worth (1995$)
B1	No Action	No remedial actions are implemented. Periodic monitoring of building structural integrity is included.	119,600
B2	Institutional Actions	No remedial actions are undertaken, however, measures are taken to reduce the potential risk to human health and the environment. This includes access restrictions such as locking buildings and construction of fences around buildings and deed restrictions to restrict site development.	11,100,000
B4	Decontamination of Indoor Areas	Chemical contamination is removed from all necessary indoor area surfaces by physical or chemical treatment. Different methods are used depending on the type of contamination and surface material. Recommended decontamination methods include dusting/vacuuming/wiping, steam cleaning, water and solvent washing, grit blasting, and scarification. Additional remedial measures can be performed if necessary.	Reuse Scenario 1: 7,861,000 Reuse Scenario 2: 9,080,000 Reuse Scenario 3: 8,323,000
B5	Decontamination/ Dismantling of Indoor Areas	Chemical contamination is removed by the decontamination methods in Alternative B4. In addition, certain building materials and particulars as well as specific surfaces that cannot be easily decontaminated will be dismantled and removed from the indoor areas.	Reuse Scenario 1: 7,842,000 Reuse Scenario 2: 9,187,000 Reuse Scenario 3: 8,320,000

SECTION 1
INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF THE REPORT

This report is one of three reports that address technologies and remedial action alternatives that may be applied to the U.S. Army Materials Technology Laboratory (MTL) in Watertown, Massachusetts. This report discusses the indoor areas and buildings, including indoor containers. A second report discusses on-site outdoor areas (soil and groundwater). A third report (yet to be completed) will address the Charles River surface water and sediments. This report was prepared by Roy F. Weston, Inc. (WESTON®) for the U.S. Army Environmental Center (AEC) [formerly Toxic and Hazardous Materials Agency (THAMA)] under the Base Closure Program Contract (DAAA15-90-D-0009, Task Order 1 and its associated modifications).

This report has been prepared to identify and screen a variety of remedial technologies that may be feasible for addressing potential risks to the public and the environment posed by contamination in buildings and indoor containers. From these technologies, several remedial alternatives were developed, screened, and evaluated in detail. The technologies were evaluated in accordance with the Massachusetts Contingency Plan (MCP) (310 CMR 40). This report is written to meet the requirements of a Remedial Action Plan (RAP) as detailed in 310 CMR 40.0861.

MTL has been the subject of Phase 1 and Phase 2 Remedial Investigations (RI) studies. Since the Phase 2 RI field studies were completed, the cleanup of radiological contamination has been handled separately from the RI/RAP process for two reasons. One reason is that the Army accelerated the schedule for cleaning up radiological contamination so that radioactive waste could be shipped to disposal sites before the end of 1992 because of concerns about losing access to the low-level radioactive waste disposal sites. The second reason is that another document, the Decommissioning Plan, needed to be prepared and submitted to the Nuclear Regulatory Commission (NRC) as part of the process of

terminating MTL's licenses to use radiological materials. The draft final Facility Decommissioning Plan was prepared by WESTON and submitted to AEC in April 1992. Because the Decommissioning Plan served the same function as a feasibility study, and because the cleanup of radiological contamination has been completed, radiological contamination is not discussed in the indoor RAP.

There is also no specific discussion in this RAP in reference to interior building plumbing. It is possible that existing contamination may be present within interior pipes. The Army will identify all process-related plumbing fixtures (sinks, traps, drains, etc.). All sinks and traps will be removed. The lines will be severed and capped to prevent future use. Non-process-related plumbing fixtures will remain in place.

Four other areas are not environmental media and are not addressed in the RAP: indoor radon, lead paint, asbestos, and underground storage tanks (USTs). The Army has ongoing programs for radon, asbestos, and USTs that investigate and remediate these potential problem areas. Those programs were started before the RI/RAP process began.

ARARs for lead-based paint are evaluated in Subsection 2.3. For lead paint, remedial measures will be implemented in conjunction with any building surface decontamination. However, lead paint remedial measures will only be necessary for structures designated for future residential reuse (see Section 2). At this point, site reuse plans have not been determined, hence it is unknown which buildings will require lead paint remediation. When final reuse plans are determined, a separate analysis will be performed identifying the buildings affected and measures that will be taken. In this RAP, remedial technologies for lead paint are not discussed, and remedial cost estimates do not include lead paint measures.

The site history and setting, as well as current site characteristics, are discussed fully in the RI reports. These topics are summarized in the following subsections. In addition, aspects of site characteristics that relate to remedial technologies and alternatives are highlighted in this section. Applicable or relevant and appropriate environmental and public health

requirements (ARARs) for contaminants of concern at the site and for subsequent remedial actions are identified in Section 2 of this RAP. In Section 3, technologies with the potential to remediate one or more of the environmental media at MTL buildings are identified and screened. Remedial alternatives are then developed from those technologies retained during the technology screening stage (see Section 4). These alternatives are then screened and retained or rejected. Section 5 provides a detailed analysis of the retained alternatives. In Section 6, the alternatives are summarized and compared on the basis of noncost and cost criteria. A preliminary alternative selection is also made in Section 6.

1.2 BACKGROUND INFORMATION

1.2.1 Installation Profile

The U.S. Army Materials Technology Laboratory (MTL) property is located on 36.5 acres of land in Watertown, Massachusetts, on the north bank of the Charles River approximately 5 miles west of downtown Boston (see Figure 1-1). The installation is bounded on the north by Arsenal Street, on the south by North Beacon Street, on the east by Talcott Avenue, and on the west by the Veterans of Foreign Wars, USA, Burnham Manning Post No. 105, and private property. An additional 11 acres of federal land south of the site and abutting the Charles River are controlled by the Commonwealth of Massachusetts and consist of a public roadway (North Beacon Street), a public park, and a yacht club. This 11-acre parcel will vest permanently and unconditionally to the Commonwealth upon disposal of MTL (USACE, May 1991). Figure 1-2 provides a topographic map of the Watertown area, including the MTL site. Figure 1-3 provides a site plan for MTL, including the potential zones for future reuse. Historical information about each building is provided in Subsection 1.2.4.

The facility was established as the Watertown Arsenal in 1816 by President James Madison and was originally used for the storage, cleaning, repair, and issue of small arms and ordnance supplies. During the 1800s, this mission was expanded to include ammunition and pyrotechnics production; materials testing and experimentation with paint, lubricants, and

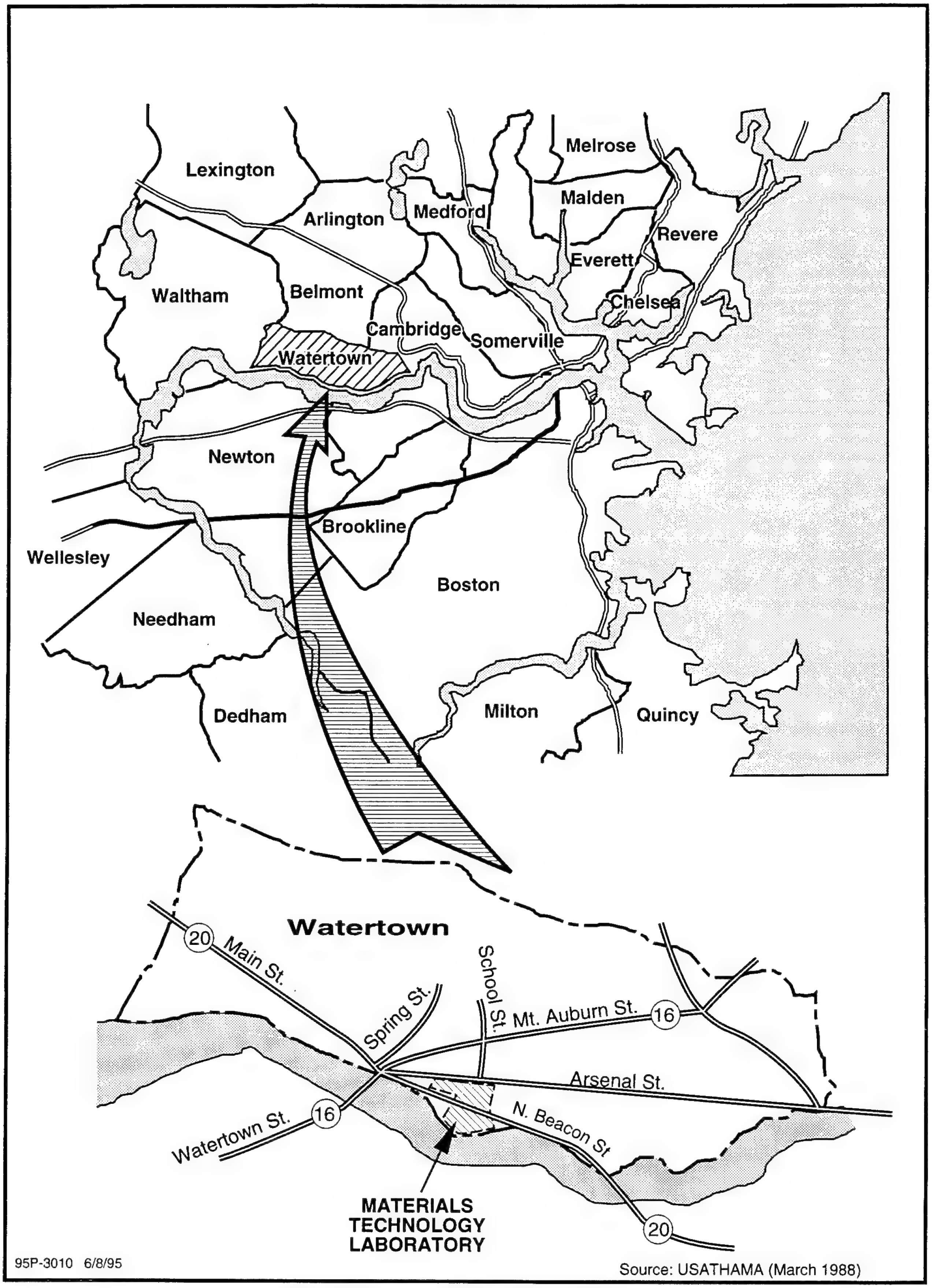


FIGURE 1-1 LOCATION OF MTL

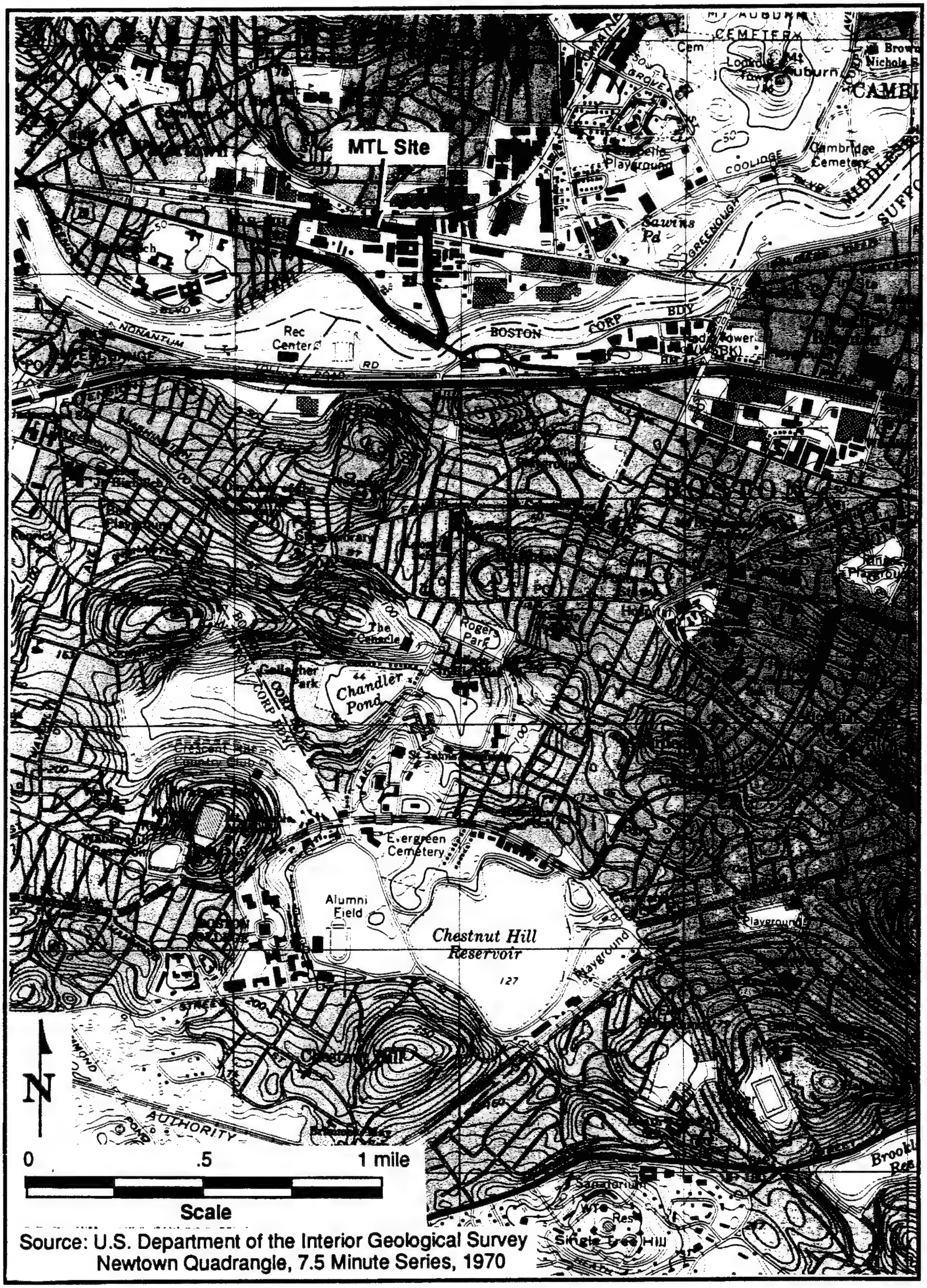
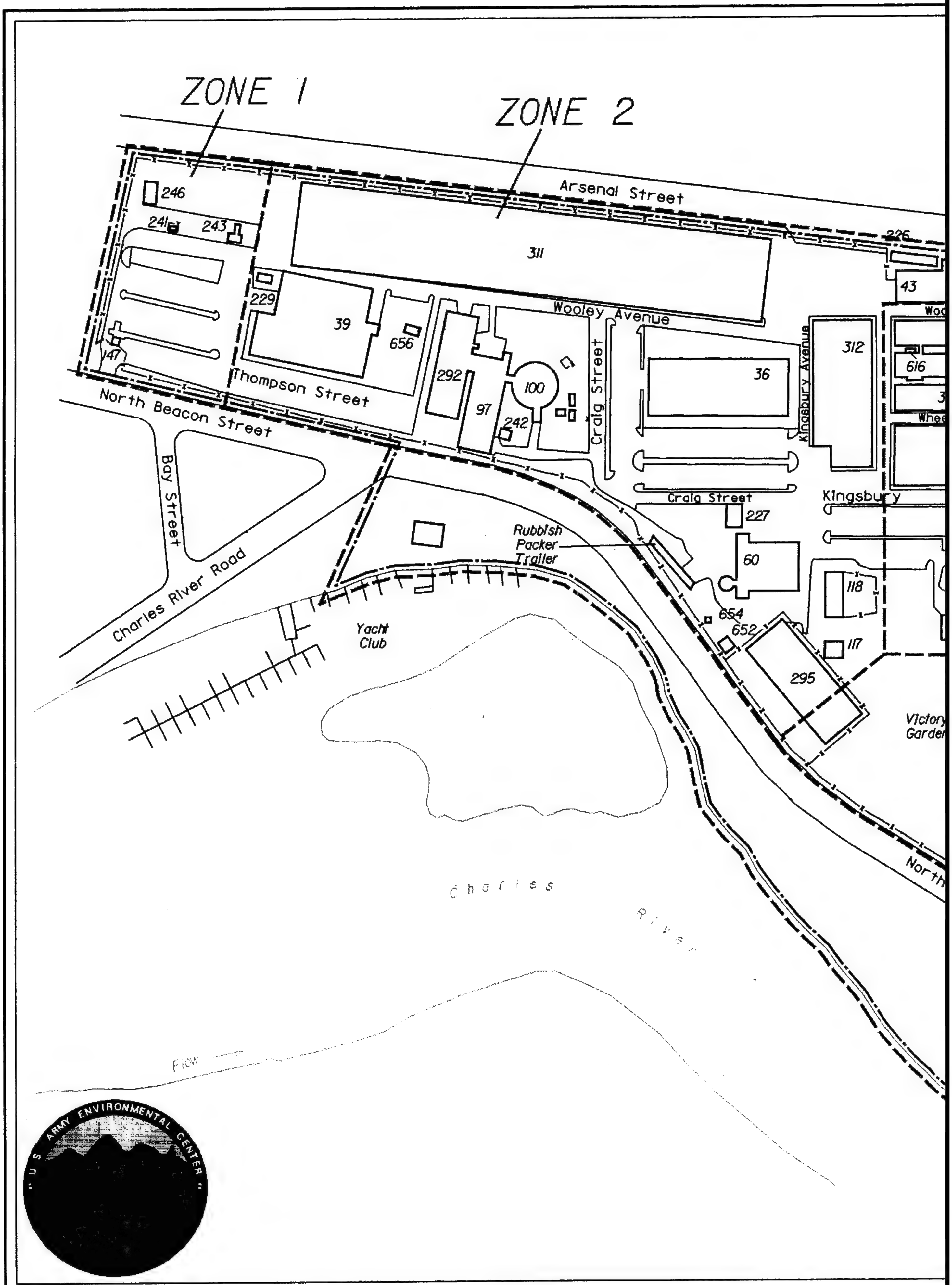
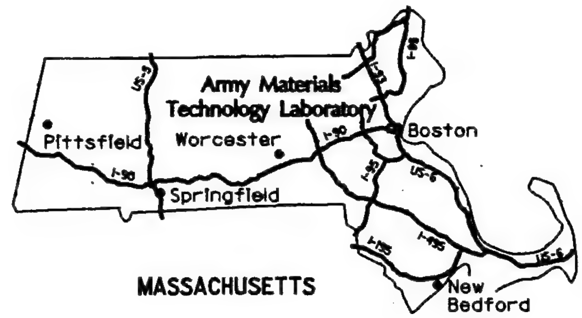
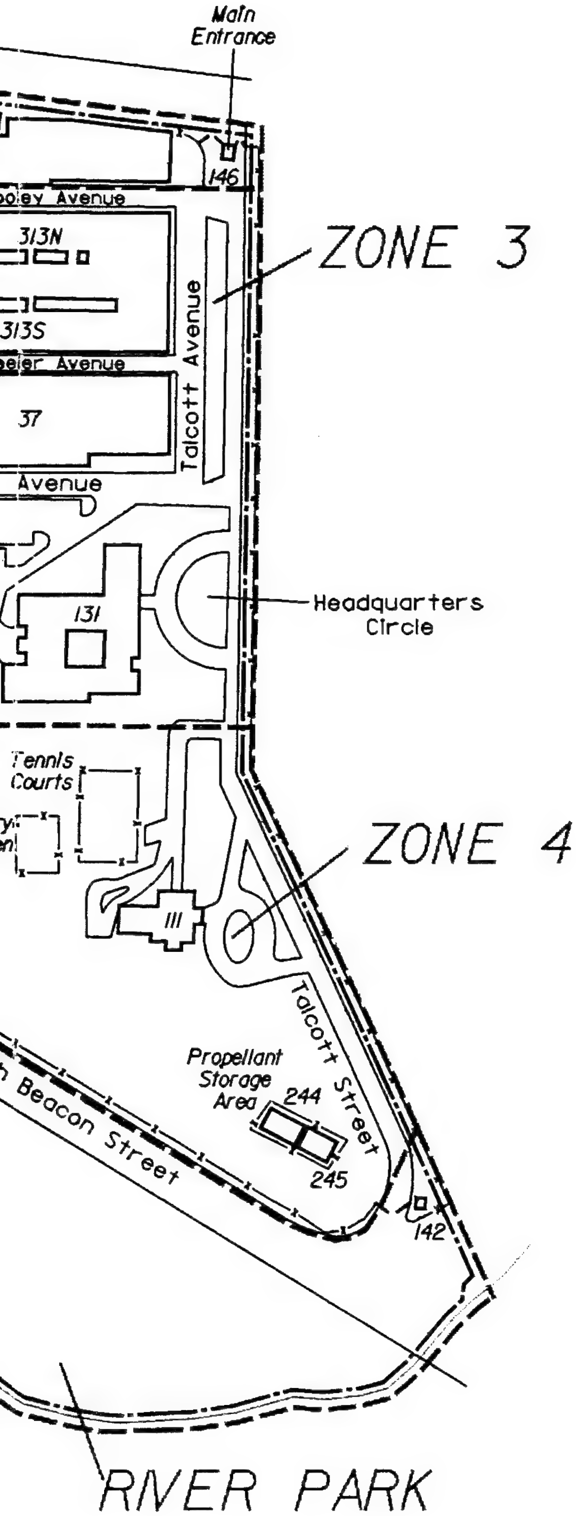


FIGURE 1-2 TOPOGRAPHIC MAP FOR MTL AND SURROUNDING AREA



ZONE 1
ZONE 2
Arsenal Street
246
241
243
311
226
43
229
39
656
Wooley Avenue
312
616
36
Craig Street
100
292
97
242
147
Thompson Street
North Beacon Street
Kingsbury Avenue
Bay Street
Craig Street
227
Kingsbury
Rubbish Packer Trailer
60
118
654
652
117
295
Yacht Club
Charles River Road
Charles River
Flow
U S ARMY ENVIRONMENTAL CENTER





Army Materials Technology Laboratory
Watertown, MA

Figure 1–3
Site Plan with
Proposed Reuse Zones

Zone Boundary

Scale
0 meters 150
0 feet 500

N

7–JUN–1995

WESTON

which time the facility encompassed 131 acres, including 53 buildings and structures, and employed approximately 10,000 people. Arms manufacturing continued at the facility until an operational phasedown was initiated in 1967. In 1960, the Army's first materials research nuclear reactor was completed at MTL, which was used actively in molecular and atomic structure research activities until 1970, when it was deactivated.

At the time of phasedown, much of the Watertown Arsenal property was transferred to the General Services Administration (GSA), and in 1968, approximately 55 acres were sold to the town of Watertown and subsequently used for the construction of apartment buildings, the Arsenal Mall, and a public park and playground. Of the 47.5 acres retained by the Army, 36.5 acres became the Army Materials and Mechanics Research Center (AMMRC), which was designated a historical landmark by the American Society of Metals in 1983.

In 1985, the AMMRC became MTL, which employed approximately 600 people and contains 30 buildings and structures. The mission of MTL was materials structural integrity testing, weapons and ammunition development and production, solid mechanics, lightweight armor development, and manufacturing testing technology. MTL discontinued operations in September 1995.

In October 1988, Congress passed the Defense Authorization Amendments and Base Realignment and Closure Act (Public Law 100-526). In December 1988, the Secretary of Defense's ad hoc Commission on Base Realignment and Closure issued its final report that included a recommendation, subsequently approved by Congress, for the closure of 81 Department of Defense installations, including MTL. A closure program was initiated by AEC, which consisted of three stages: preliminary assessment/site inspection (PA/SI), remedial investigation/feasibility study (RI/FS), and remedial actions.

In March 1989, AEC was assigned the responsibility for centrally managing the Base Realignment and Closure Environmental Restoration Program. As a result of the closure and realignment of MTL, additional environmental investigations were mandated prior to the sale of any MTL property. As directed by AEC, WESTON has completed RI/FS efforts

(initiated by EG&G Idaho in 1988) in order to address issues raised by the closure and reuse of MTL.

In July 1992, USACE started decommissioning the research reactor and depleted uranium facilities. The reactor building (Building 100) was completely removed and an extensive cleanup was completed in Buildings 43, 312, 39, 311, 37, 292, 97, and 313. The bulk of the cleanup was completed by the summer of 1993.

1.2.2 Site Setting

This subsection contains a brief description of the site setting, including information on topography, land use, climate, surface hydrology, geology, hydrogeology, and ecology. A more extended discussion of these topics is contained in Section 3 of the RI.

The site and surrounding area are generally flat, decreasing in elevation from approximately 36 feet above mean sea level (MSL) along the northern boundary to approximately 2.4 feet above MSL at the edge of the Charles River. The original, glacially formed land surface has been extensively filled in with sand, gravel, and construction debris to level the northern portion of the site for the construction of buildings and parking lots.

Climatic conditions at the meteorological station at Logan International Airport, which is 8 miles east of MTL, include a mean temperature of 72.7 °F for July and 28.6 °F for January. The mean annual precipitation is 41.6 inches. The prevailing winds are either from the southwest or northwest, depending on the time of year. The average annual wind speed is approximately 12 miles per hour.

The MTL site slopes approximately 20 feet from the northern portion to the southern boundary. Therefore, the natural drainage pattern that surface runoff would follow is north-to-south towards the Charles River. The major segments of the stormwater collection system follow this pattern and empty into the Charles River in a series of outfalls. Minor

segments of the system bring stormwater from cisterns and catch basins throughout the site to the major segments.

Bedrock geology has been determined by soil borings conducted during the Phase I and Phase II efforts as well as previous investigations. The approximate depth to bedrock is a minimum of 50 feet below ground surface in the western portion of the site and a maximum of about 100 feet in the southeastern portion. The bedrock is the Pennsylvanian-age Cambridge Argillite. This was described as highly folded based on a rock coring taken during the Phase 1 RI. The originally horizontal bedding had folded to a vertical orientation (EG&G, 1990). The Cambridge Argillite is typically a varied (rhythmically layered) siltstone. Beds range in thickness from 0.1 to 8 cm (0.04 to 3.1 in.) and vary from dark-gray clay and silt-rich layers to light-gray fine and very fine-grained sand layers. The bedrock is part of a syncline, or broad fold. The syncline axis has an east-west orientation.

In general, the overburden deposits at MTL consist of (in ascending order) basal glacial till directly overlying bedrock, silty clay with some fine sand and gravel, interlayered outwash deposits of sand and gravel with some fine materials, and finally, more recent deposits and fill near the surface. These deposits, which are present throughout the site, are described in detail in Subsection 3.5.2 of the Phase 2 RI.

Hydrogeological investigations indicate that regional groundwater flows away from the topographic high areas and towards the Charles River. The depth to groundwater varies from 5 feet along the southeastern boundary to a maximum of approximately 30 feet along the eastern boundary, where the ground surface reaches its maximum elevation and coarse-grained deposits allow rapid soil drainage.

The general groundwater flow direction is south-southeast towards the Charles River. Approaching the river, shallow groundwater flow veers directly into the river. The exact direction of deep groundwater flow near the river has not been determined. The flow velocity for the shallow groundwater varies from 0.3 ft/day to 1.8 ft/day.

The ecological setting of MTL is urban. The majority of MTL is covered by buildings or paved parking lots. A number of species of wildlife and vegetation exist at the site but no endangered or threatened plant or animal species are believed to be on the site.

The Charles River is managed by the Massachusetts Department of Fisheries and Wildlife as a warm water fishery. A number of fish species inhabit the river in the vicinity of Watertown and ducks and geese may frequent the Charles River during migration.

The most recent National Wetlands Inventory Map for the MTL area (1977) indicates no natural drainages on MTL. The nearest wetland area is an unnamed island in the Charles River immediately south of the North Beacon Street Park.

1.2.3 Nature and Extent of Contamination

1.2.3.1 Previous Site Investigation

The Phase II RI report listed 7 previous investigations, including the Phase I RI. Findings of the previous indoor investigations are summarized as follows:

Department of the Army, U.S. Environmental Hygiene Agency, May 1979 - Incompatible chemicals were stored together in Building 241. Accidental spillage of beryllium (Be) occurred in machining area.

USATHAMA, April 1980 - Records search identified depleted uranium (DU), Be, heavy metals, and organic reagents as major potential site contaminants. Investigation of Building 313 cistern identified potential environmental problems. There was evidence of former pipes leading into the system.

EG&G, Environmental Investigation Status Report, 1990 - Presented results of the 1988 field effort. These results were evaluated in the Phase 1 RI.

WESTON, Phase 1 RI, 1991 - Several indoor wipe, dust, and air samples were collected. PCBs were found on a transformer. Low levels of metals were found in dust samples. Air samples indicated that elevated levels were not present.

The results of this work up to 1990 were incorporated into a Scope of Work (SOW) for Phase II RI activities. The SOW provided for surficial wipe sampling within MTL buildings. Because of the prohibitive costs associated with sampling all of the rooms in each MTL building, the SOW provided for a sampling program intended to give an overall characterization as to the type and amount of contamination in each site building.

In keeping with the intent of the SOW, it was determined that only those rooms known or suspected to have housed potentially hazardous substances would be sampled (i.e., rooms whose current or historic uses may result in surficial contamination in sufficient concentrations and of sufficient toxicity to pose potential threats to human receptors). As a result of this sampling strategy, approximately 800 wipe samples were collected from within MTL buildings.

Figures indicating the rooms sampled during Phase II are provided in Appendix B.

1.2.3.2 Findings of the Phase 2 Remedial Investigation

An extensive surface wipe and air sampling program for chemical contaminants was conducted inside MTL buildings during the Phase 2 RI. The wipe sampling program was conducted in late 1991, before the radiological decommissioning was performed. Approximately 800 surface wipes were collected in laboratories, machining, maintenance, and storage areas that are likely to be frequently occupied in the future. Background wipe samples were collected from 4 separate off-site commercial locations which included the main bay of the Watertown Firehouse, the basements of the Cuniff Elementary School and Hellenic Council and a small storage bay of a lumber/hardware store. In general, composite wipes were taken on the walls and floors for all of these areas and additional

wipes were taken where fume hoods, floor drains, exhaust vents, and accessible I-beams existed.

A total of 82 different chemicals were detected in one or more wipe sample. The bulk of the detections were inorganic compounds, but semivolatile compounds, pesticides, PCBs, and a few explosive compounds were also detected at lower frequencies.

The most common surface contaminants are metals. Chromium, cadmium, lead, and nickel are found at least once in most of the buildings that had industrial or research activities. Chromium, cadmium, and lead are used as color additives in paints. Chromium, cadmium, and nickel are used as protective coatings for metals. The specific source is unknown but the contamination would probably be present in the paint or in a layer on the surface.

Elevated surface concentrations of arsenic were predominantly found at least once in most of the buildings that had industrial and research activity. The source of the arsenic is not known. Arsenic is used as a metal alloy, in pesticides, and as a wood-treating agent. These processes would probably produce surface contamination only.

Elevated levels of beryllium were found in eight buildings. Beryllium was machined in the Beryllium Machine Shop on the first floor of Building 312. Beryllium metal pieces were machined using drills, lathes, grinders, and other machines. Two ventilation systems, a vacuum system that was connected directly to machines and glove boxes, and the room air system, carried beryllium to the third floor where it was found on surfaces. Beryllium also may have been stored on the third floor. Beryllium powder was also used in the laboratories.

Other metals were found to a lesser extent during the sampling program. Antimony, barium, mercury, silver, vanadium, and cyanide were detected in a small number of wipe analytical results at levels that exceeded the cleanup goals. These metals are used in paints (barium), metal coatings, photographic film, and other applications.

Semivolatile compounds or BNAs were detected in all of the buildings that were used for research or industrial activities. The most commonly detected BNA compounds are bis (2-ethylhexyl) phthalate, butylbenzyl phthalate, benzo[a]anthracene, chrysene, di-n-octyl phthalate, and di-n-butyl phthalate. These materials can be present in or result from hydrocarbon combustion, oil spills, mineral oil and waxes in containers, refuse burning, and coal refuse. Benzo[a]anthracene has been identified in cigarette smoke.

Phthalates were detected in many areas. There were many samples where the phthalates results could only be reported as greater than (GT) a value because the total level of contamination for those wipe samples exceeded the limit of the GC column. The phthalate GT results were generally in the range 5 to 10 mg/m^2 while the levels of no significant risk ranged from 7.4 mg/m^2 for bis (2-ethylhexyl) phthalate for the residential scenario to 20,000 mg/m^2 for butylbenzyl phthalate for the commercial scenario. Because the actual result is uncertain, all GT results were identified as exceeding the levels of no significant risk.

Phthalates are components of widely used materials. Bis (2-ethylhexyl) phthalate is widely used in liquid soap, detergents, lacquers, pesticides, oils, and as components in polyvinyl chloride and other polymers. Butyl benzyl phthalate is used in PVC-based flooring products, adhesives, and coatings. Di-n-butyl and di-n-octyl phthalate, which were found to a lesser extent, are also used as plasticizers in plastics and rubber materials. (This information was taken from the Hazardous Substances Data Bank). For those samples for which phthalates were reported as GT, 54% were taken on floor tiles and 92% were taken on the floor.

Migration of BNAs into the various surfaces may have occurred. Most of the site activities would probably not promote the penetration of contamination except for oil spills. However, the contaminant may exist as a strongly adhering film that may be difficult to remove by surface decontamination methods.

PCBs were found in nine buildings (36, 37, 39, 43, 60, 243, 292, 311, and 312). PCBs can be contained in transformers, capacitors, electrical insulations, and lubricating oil for pumps. PCBs can penetrate paint and concrete and will probably require surface removal. PCBs

in oil can penetrate many inches into concrete. If only the surface is cleaned, the subsurface PCBs can seep back out.

Ten pesticide compounds were found scattered throughout most of the buildings. The most common are Dieldrin, DDT, Aldrin, Endrin, and methoxychlor. Although the source of these contaminants is unknown, presumably it is from casual use of various pesticides inside the buildings. The depth of penetration depends on the carrier material. Since pesticides are generally applied with little or no moisture, it is assumed that the contamination exists as a surface layer only. However, the surface layer may be tightly adhering and may be difficult to remove using surface decontamination methods.

The explosives 2,4-dinitrotoluene and RDX were found in Buildings 311, 313, and the explosives bunker. Presumably the explosives were deposited as dust from firing of rounds and from spillage of stored explosives. It is assumed that the explosive exists as a lightly adhering surface residue that could easily be removed.

An indoor air sampling program was conducted, and the results were compared against the air quality standards discussed in Subsection 2.2.2. There were no instances where any of the air concentration guidelines were exceeded. Therefore, no remedial action is required to reduce air concentrations.

1.2.3.3 Determination of Remediation Cleanup Goals

A risk assessment was conducted to evaluate the potential for risks to future human populations that could use MTL buildings either in an occupational or residential setting (WESTON, 1995). Two possible future reuse scenarios, commercial and residential, and three exposure pathways, inhalation, ingestion, and dermal contact, were considered. This risk assessment determined that the risk-based limits established in accordance with the MCP were exceeded. The MCP goals are total excess cancer risk less than 1E-5 and Hazard Index less than 1.0. The Hazard Index is a measure of noncancer health effects and

is defined as the sum of the ratios of the daily intake from all pathways to the safe limit for which there will be no noncancer health effects.

Remediation cleanup goals were established for each compound such that the MCP goals for cancer risk and noncancer health effects would be met. Cleanup goals were developed for two future use scenarios: residential and commercial. A cleanup goal was established for each compound by assuming that the compound contributed one-tenth of the total risk or Hazard Index for that area. It was determined by examining the indoor risk assessment that limiting the risk and the hazard index from any compound to one-tenth of the total allowed value would result in the total risk and hazard index meeting the MADEP requirements. In all cases, 95% of the total risk or Hazard Index was the result of a few compounds, at the most eight. Therefore, for each scenario, the risk-based cleanup goal for each compound was established such that the lifetime cancer risk was 1E-6 and the hazard index was 0.1. The risk-based cleanup goals for the two scenarios are presented in Table 3-1 in Section 3. Some compounds that were detected on wipe samples were eliminated from consideration in the risk assessment because they are essential human nutrients or were infrequently detected. Therefore, there are 49 compounds in Table 3-1 instead of 82.

Because many of the compounds are naturally occurring or are ubiquitous because of human activity, the cleanup goals were compared with background concentrations for each compound. In general, background levels were established based on samples collected from four off-site buildings for the commercial scenario and three on-site residential buildings for the residential scenario. The use of residential background data from on-site buildings will compensate for the fact that nearly all of the on-site building interiors are likely to be covered with lead-based paint. The Army will be addressing the issue of lead-based paint in compliance with Title X of the federal Residential Lead-Based Paint Reduction Act, and with the Massachusetts Lead Law (M.G.L. ch. 111, s. 189A-199B). It is not the intent of this study to identify buildings that have lead-based paint but rather identify buildings that have contamination as a result of industrial or research activities.

The on-site residential buildings 111, 117, and 118 were used as background for the residential scenario because industrial or research activities have not been conducted in these buildings. Building 111 has been used as residential quarters since it was built in 1865. Buildings 117 and 118 were originally built as a cow barn and a horse stable, respectively, but were converted in the 1930s. Therefore, these buildings have been used as residential quarters for over 60 years and it is unlikely that contamination from other on-post activities would have spread to the building interiors. The field sampling team reported that the buildings did not appear to be unusually contaminated for residential quarters and the areas where wipe samples were taken were not stained, as, for example, from a leaking heating oil tank. However, because two samples from Building 111 had generally high contamination levels for many compounds, these two samples were rejected as outliers. The background level was established as the maximum background sample concentration after these two samples were excluded.

A comprehensive series of tables detailing the determination of risk-based cleanup goals and background levels is presented in Appendix A.

The compounds that exceeded the levels of no significant risk (i.e., risk-based cleanup goal or background) for surfaces are listed in Tables 1-1 and 1-2. These contaminants fall into five categories:

- Metals
- Base Neutral Acid Extractables (BNAs)
- Pesticides
- PCBs
- Explosives

A compilation of sitewide building rooms and areas requiring remedial action is contained in Appendix A. Surfaces include walls, floors, local exhaust vents, fume hoods, floor drains, and I-beams. The surface types requiring remediation include painted and unpainted concrete, brick, concrete block and dry wall, floor tile, wood, and metal. Surface areas requiring remediation have been estimated on a square footage basis for each type of surface and contaminant present.

Table 1-1

Compounds Exceeding Levels of No Significant Risk - Residential Scenario

Analyte	Number of Hits	Buildings
Metals		
Antimony	36	36,37,39,292,311,312,313
Arsenic	86	36,37,39,43,111,243,292,311,312,313
Barium	288	36,37,39,43,111,243,311,312,97,118,131, 292,313
Beryllium	75	37,39,43,243,292,311,312
Cadmium	141	36,37,39,43,111,292,311,312,313,97
Chromium	405	36,37,39,43,97,111,131,243,292,311,312,313117
Cyanide	4	39,312
Lead	270	36,39,111,312,313,37,43,97,117,131,243,292,311
Mercury	25	37,39,97,292,312,313,43
Nickel	107	36,37,39,43,97,243,292,311,312,313
Silver	9	36,39,292,312
Vanadium	8	37,39,292,311
Semivolatile Compounds		
Benzo[a]Anthracene	33	37,39,60,97,292,311,312,313
Benzo[a]Pyrene	1	60
Benzo[b]Fluoranthene	5	97,312
Benzo[k]Fluoranthene	8	37,39,292,312,313
bis (2-Ethylhexyl) Phthalate	135	36,37,39,97,118,131,243,292,311,312,313
Butylbenzyl Phthalate	119	36,39,97,118,131,292,311,312,313
Chrysene	30	36,37,39,60,97,292,311,312,313
Di-n-Butyl Phthalate	15	37,19,131,292,312
Di-n-Octyl Phthalate	25	37,39,118,131,292,311,312,313
Dibenz[a,h]Anthracene	1	313
Fluoranthene	1	311
Phenanthrene	1	60
Pyrene	1	60

Table 1-1

Compounds Exceeding Levels of No Significant Risk - Residential Scenario (Continued)

Analyte	Number of Hits	Buildings
Pesticides		
Aldrin	15	37,39,43,311,312
beta-Endosulfan	2	292,311
DDE	2	117
DDT	12	37,117,243,292,311
Dieldrin	37	36,37,60,111,131,243,292,311,43
Endrin	9	243,292,311
Heptachlor	1	311
Heptachlor Epoxide	2	311
Lindane	1	311
Methoxychlor	9	37,311,312,292
PCB		
PCB	51	36,37,39,43,60,243,292,311,312
Explosives		
2,4-Dinitrotoluene	10	245,312,313
RDX	27	244,245,311,312,313

Table 1-2

Compounds Exceeding Levels of No Significant Risk - Commercial Scenario

Analyte	Number of Hits	Buildings
Metals		
Antimony	3	39,313
Arsenic	10	37,39,313
Barium	47	36,37,39,43,243,311,312,313
Beryllium	60	37,39,43,243,292,311,312
Cadmium	57	37,39,43,292,311,312,313
Chromium	245	36,37,39,43,97,111,131,243,292,311,312,313
Lead	270	36,37,39,43,97,111,117,131,243,292,311,312,313
Mercury	2	39
Nickel	32	37,39,43,311,312,313
Semivolatile Compounds		
Benzo [A] Anthracene	7	39,60,311
Benzo [A] Pyrene	1	60
Benzo [B] Fluoranthene	3	292,313
bis(2-Ethylhexyl) Phthalate	125	36,37,39,97,118,131,243,292,311,312,313
Butylbenzyl Phthalate	111	36,39,97,118,131,292,311,312,313
Chrysene	5	39,60,311
Di-n-Butyl Phthalate	15	37,39,131,292,312
Di-n-Octyl Phthalate	25	37,39,118,131,292,311,312,313
Dibenz [A,H] Anthracene	1	313
Fluoranthene	1	311
Phenanthrene	1	60
Pyrene	1	60
Pesticides		
beta-Endosulfan	2	292,311
Dieldrin	4	243,292,311
DDE	2	117
DDT	12	37,117,243,292,311
Endrin	9	243,292,311
Lindane	1	311
Methoxychlor	2	292,311
PCB		
PCB	48	36,37,39,43,60,243,292,311,312
Explosives		
2,4-Dinitrotoluene	6	245,313
RDX	4	311,312,313

Table 1-3

Rooms Cleaned During Radioactive Materials Decommissioning

Building	Floor	Rooms
39	1	101A, 106, 108, 110, 114, 115, 117, 121, 122, 123, 124, 125, lobby, 127, 128, 130, 131, 132, 133, 134, 142, 143, 145, 155A, 155B, 160A, Men's room (west), Hallways No. 2, 3, and 6
	2	202, 208, 223, 224, 247, 248, Women's room, Hallway No. 2
	3	Women's room
	4	Women's room
	5	501, 502, 503, 503A, 512, 513, 514, Men's room
43	1	All
292	1, 2	North stairwell
311	1	Various portions of the building were cleaned, refer to plans.
312	1	101 through 126, 128, 137, 138, 139, 155, 156
	2	219, 222, 223, 225
	3	All
313	Basement	Cistern

Note: Confirmatory sampling will be conducted to establish the extent of chemical contamination removed because of radiological decontamination activities.

Since the wipe data were collected prior to the site radiation decontamination, certain areas identified requiring chemical remediation have been decontaminated previously for radiological parameters. These areas are listed in Table 1-3. For these particular areas, additional remediation may not be necessary. These areas will first have confirmational sampling for chemical parameters that will be performed in these areas. Based on these results, only areas that remain above chemical cleanup goals will undergo further remediation.

A review of these tables indicates that while contamination is located in many areas, the magnitude of contamination is not very great, i.e., most of the contaminant hits are near the comparison levels. Appendix B presents floor plans for all building floors and areas that will require remedial action.

1.2.4 HISTORICAL USE OF SELECTED BUILDINGS

Past use of the buildings investigated is discussed in the following subsections, with particular emphasis on potential sources of radiological or chemical contamination. Figure 1-3 depicts the locations of these buildings.

1.2.4.1 <u>Building 36</u>

Building 36 was erected in 1900. The building has undergone several renovations and additions and currently measures 110 ft by 275 ft long. The building has been used for manufacturing high-explosive shells and armor-piercing shells, assembling gun carriages, and storing rubber materials and gun carriage parts.

The building contains an auditorium, a library, a cafeteria, a photographic laboratory, conference rooms, and offices. There is also a mezzanine level in the library. The basement formerly held a fallout shelter.

1.2.4.2 Building 37

Building 37 is a three floor brick building built in 1851. It has undergone several additions and renovations and currently measures 131 ft by 315 ft. The building has housed several operations, including a machine shop, equipment maintenance shop, iron and brass foundry shops, an open hearth furnace, various equipment and hazardous material shops, kilns, quenching tanks, administrative offices, and general storage areas.

The first floor most recently housed an automotive repair shop, storage for lawn care equipment, a carpentry shop, a paint shop, building material storage areas, a welding facility, and automotive garages. The second floor housed the risk management offices including facility environmental coordination offices and a radiological calibration source laboratory. The third-floor area was most recently used to house the engineering plans, off-site contractors offices, and the BRAC office.

1.2.4.3 Building 39

Building 39 is a five-story building of typical reinforced concrete construction with posts 20 feet on center and typical 1920 curtain wall facade. The building was constructed in 1922 as a privately owned piano factory. It was also used as a mattress factory prior to its acquisition by the Army in 1941. In the mid-1950s, portions of the building were occupied by the U.S. Atomic Energy Commission, the U.S. Air Force Geophysics Laboratory, and the USACE Soils Laboratory and Engineering Warehouse. The types of activities performed by these agencies are unknown.

Up to 1995, the building housed numerous laboratories and offices. Research work performed in the laboratories included organic synthesis, crystallography, metals, ceramics, organic materials, corrosion, mechanics and structural integrity, computer systems, and instrument calibration operations. The offices were occupied by various research scientists, engineers, and administrative personnel.

Little is known about the early use of radioactive materials in this building. Reportedly, Room 101 on the first floor was used to melt small (40-pound) depleted uranium (DU) ingots in the 1950s. The polishing of DU was performed in Rooms 145, 146, and 147. Corrosion testing of DU was conducted in Rooms 202 and 206. A DU machine shop was located on the second floor in the area around Rooms 202, 247, and 248. The exact location is uncertain. The fifth floor contained an analytical laboratory in Rooms 501 and 512, where some DU was analyzed using wet chemical techniques and emissions spectroscopy was performed on solutions containing DU. A 1959 Nuclear Regulatory Commission (NRC) inspection report mentions nickel (Ni-63) in an hydrochloric acid (HCl) solution, H-3 (tritium) in stearic acid, and Po-210 (polonium chloride) being stored in a fume hood in the isotope laboratory of Building 39. These liquids were reportedly poured down the drain to the sanitary sewer.

In 1960, DU operations were transferred from Building 39 to other facility buildings, including Building 43.

1.2.4.4 <u>Building 43</u>

Building 43 is a large, high-bay, one-story brick and steel building that was originally built in 1862. The building has undergone several renovations and additions and currently measures approximately 20,000 ft^2. It was originally constructed to house a blacksmith shop. Other metal processing operations, including forging iron parts for use in seacoast gun carriages, were also performed.

In addition, the building was used for processing radioactive materials, although it was not determined when such operations were begun. The east end of the building had a concrete floor in the 1950s, but part of the floor was still dirt until the mid-1960s, when the building was used as a forge shop (MTL employee, 1992). One of the first reported uses of DU occurred in the mid-1960s, when a salt bath that was located in the southeast corner of the building was used to heat DU billets. They were extruded on the 1,000-ton press located in the northeast corner of the building (MTL employee, 1991). It is not known whether this

was done before or after the dirt floor was installed. Around 1963, the melt furnace was transferred from Building 421 (in what is now the tennis/basketball courts in Arsenal Park) and installed in the annex on the north side of Building 43 (MTL employee, 1992).

Recent operations included two DU melt furnaces and a heat treat furnace in the melt room located in the annex on the north side of the building. The annex contained a lathe, a mechanical saw, and a ventilation system. The main bay of Building 43, called the Forge Shop, contained a variety of mills, presses, and ovens, some of which were used primarily for processing DU. These DU machines are located at the east end of the building, and a DU incinerator is located in the southeast corner. This DU equipment was removed by Morrison-Knudsen Corporation in the fall of 1992.

The incinerator burned DU chips and turnings. The emissions went through a scrubber and a high-efficiency particulate air (HEPA) filter and out the east end of the building. In recent times, the emissions were monitored by radiation stack monitors (MTL, 1988). The scrubber water was monitored to ensure that its concentration was less than the water effluent limits specified in 10 CFR 20 and was then poured down floor drains that discharged to the sanitary sewer (MTL, 1977).

As part of radiological decommissioning of the facility, remediation of the interior of Building 43 commenced in November 1992. Remediation included CO_2 blasting of interior surfaces, removal and disposal of the concrete floor and the drainlines beneath the floor, and soil removal (to a depth of over 10 feet bgs). Floor excavation was complete as of January 1995.

The roof of the main bay consists of two sloped sections surmounted by a V-shaped roof above a clerestory. The two sloped sections, which were originally composed of asbestos concrete, were replaced with metal panels in 1990.

1.2.4.5 Building 60

Building 60 was constructed in 1913 and 1914 as a central powerhouse and boiler room building. The boiler was originally coal-fired but was later converted to fuel oil. The plant produced electricity until 1919.

The building housed four oil-fired boilers that until May 1994 produced steam for heating other buildings in the installation. The steam was piped through underground steam tunnels to each building. During the 1994/1995 heating season, either gas or oil-fired heaters were used for heating each installation building. Plans are currently underway for the removal of some of the Building 60 boilers. The former asbestos/cement roof was replaced with a metal roof in 1990. In April 1992, during a Phase 2 sanitary sewer investigation (WESTON, May 1994), a No. 6 fuel oil leak was detected within a sanitary sewer line located adjacent to the northwest corner of Building 60. It was determined that the leak had occurred from plumbing associated with in-tank steam heaters in the vicinity of Building 60/227 (See Subsection 1.2.2.11 for a description of structure 227). Following notification of the proper authorities, a soil removal operation was undertaken on April 30, 1992. The operation included removal of more than 175 tons of contaminated soil, 430 gallons of waste oil, 25 tons of asphalt, 1,500 pounds of oily solids, the steam heater, and associated piping. In August 1994, ABB Environmental Services (ABB-ES) performed pre-design field studies at two sites within the installation, one of which was the area of Building 60/227. The results of this work are briefly discussed in Subsections 1.2.4.3.2 and 1.2.4.3.3. However, this work was conducted under the MCP (40 CMR 40.0000), and is excluded from consideration under CERCLA, as the contamination resulted from a petroleum fuel release. Therefore the ABB-ES results are not included in the human health or terrestrial ecological risk assessments which are written in accordance with CERCLA requirements, nor are they considered when calculating soil cleanup goals and cleanup volumes in Section 2.

1.2.4.6 Building 97

Building 97 was constructed in 1920 and measures 56 ft by 185 ft. The building was reportedly used as a railroad locomotive repair shop. It was renovated and converted in the late 1950s to house operations associated with the nuclear research reactor.

Until 1995, the building contained various laboratories, male and female shower areas, an ion implantation facility, and a particle accelerator for neutron production.

An NRC inspection report dated 1962 indicates that radioactive by-products were being stored in the building. Liquids from the reactor and the laboratories drained to a sump in the south end of the building. The liquid was pumped to three 3,000-gallon indoor aboveground tanks. The wastewater was monitored and released to the sanitary sewer if it was determined to be below effluent limits.

A 1966 NRC inspection report discusses the Kaman neutron generator that was located in Room 145. This generator used 7-curie tritium targets. The neutron generator used a vacuum system to collect tritium (H-3). Air monitoring for tritium was being performed, but none was detected. The NRC inspection report also mentions that experiments were being performed in Room 144 using microcurie amounts of 5 to 35.

The Kaman neutron generator has been removed except for the utility connections. The liquid waste sump is present, but the three 3,000-gallon aboveground tanks have been removed to accommodate an accelerator. The water from the sump is pumped directly to a drain that discharges to the sanitary sewer.

The reactor license was terminated in October 1993. The existing facility license requires confirmation sampling of Building 97 by the NRC. Tritium washing and drainline removal were completed in December 1994.

1.2.4.7 Building 111

Building 111 was built in 1865. It is three stories tall, constructed of brick, and contains approximately 12,000 ft^2 of floor space. The building provided housing for the installation's Commanding Officer and his family. It is listed on the National Register of Historic Places.

1.2.4.8 Buildings 117 and 118

Buildings 117 and 118 were built in 1906 and 1851, respectively. The buildings were originally constructed to house cows and horses. They were later renovated and converted to provide military housing. Building 118 was also previously used to house the Post fire engine. Until recently, Building 117 was used for military housing, and Building 118 was used for military dependent housing.

1.2.4.9 Building 131

Building 131, a two-story brick building (three-story on the southwest side) containing four separate floors, including a basement, was built in 1900 and expanded in 1942. It has undergone several renovations and additions and currently contains approximately 68,000 ft^2 of floor space.

The building has been used for administration since its construction. Currently, several installation administrative offices, including budget, procurement, personnel, records management, laboratory administrative offices, and technical planning offices, are located in this building. The building also contains a mail room, photo shop, print shop, and formerly contained a health clinic.

1.2.4.10 Structure 226

Structure 226 was a concrete tank vault located at the northwest corner of Building 43, and housed two 13,000-gallon heating oil tanks. The vault roof was at grade, and the vault itself

was accessible from the surface through a bulkhead. The vault was of concrete construction. No known spills or releases were associated with this vault. The tanks and structure were removed in September 1993.

1.2.4.11 Structure 227

Structure 227 is a brick and concrete containment structure, housing pumping equipment and two 25,000-gallon No. 6 fuel oil tanks. Historical documents (THAMA, April 1980, and EG&G, March 1988) also list this structure as a possible source of the 1979 No. 6 fuel oil release to the Charles River although all other available historical data and information do not substantiate this source. In addition, Structure 227 was included in the recent ABB-ES post-RI investigations (ABB-ES, December 1994) of a fuel release into the sanitary sewer system (see Subsection 1.2.2.5 for details of the ABB-ES investigation).

1.2.4.12 Structure 229

Structure 229 is a 9-ft-by-15-ft concrete building constructed in the early 1940s. It is used to house cooling oil pumping equipment. An associated 3,000-gallon underground storage tank (UST) was removed in 1991.

1.2.4.13 Building 241

Building 241 is a 26-ft-by-18-ft prefabricated metal building that was erected on an existing concrete slab in the early 1980s. The building was used for storing drums and barrels containing DU and beryllium waste products prior to off-site shipment.

1.2.4.14 Building 243

Building 243 is a 20-ft-by-30-ft brick building constructed during the 1950s. A 20-ft-by-12-ft prefabricated metal storage building was added in the 1970s. Both buildings are used for storage of various chemicals prior to laboratory use.

1.2.4.15 Structures 244 and 245

Structures 244 and 245 were propellant/explosives storage bunkers, situated side by side. The former bunkers are located near the guardhouse in the southeast corner of the site. As of the production of the Phase 2 RI Report (WESTON, May 1994) Bunker 244 was empty. An inventory of the contents of Bunker 245 at the time of production of the RI Report is provided as part of Appendix L of RI Report. It should be noted here that while Bunker 244 was empty, researchers and scientists were allowed to keep a maximum of 5 pounds of explosives in selected areas of Buildings 312 (former firing range) and 313 (former firing ranges). This was also true for the detonics lab in Building 311 until it was closed in 1992.

1.2.4.16 Building 246

Building 246 is a 30-ft-by-60-ft prefabricated metal building constructed during the 1970s. The building is used for storage of road and grounds maintenance equipment and supplies.

1.2.4.17 Building 292

Building 292 is a two-story brick building constructed in 1920. It currently measures 70 ft by 215 ft. The building was originally built as a metal stock storehouse. It was also used to house a plating shop operation. The building was renovated in the late 1950s and converted to a general laboratory building.

Until the summer of 1995, the building contained several offices and laboratories. Laboratory operations performed included X-ray diffraction, electron micrography, chromatography, and analytical wet chemistry.

It is not known when DU was first used in this building. Pieces of DU material were used in various experiments or tests, and DU was analyzed by x-ray diffraction in Rooms 205 and

212. Wet chemistry analysis involving radioactive materials was also performed in Room 212. As if April 1991, DU was no longer used in this building.

Radiological remediation of the building was completed in May 1993. The current NRC status of Building 292 is pending review of the remediation report and final termination surveys by NRC.

1.2.4.18 Structure 295

Structure 295 is a large concrete containment structure housing four 100,000-gallon aboveground No. 6 fuel oil tanks. Two historical documents (THAMA, April 1980 and EG&G, March 1988) refer to a possible 1970s No. 6 fuel oil spill from this structure to the Charles River. However, all other available historical data and information do not substantiate this spill. Two other fuel oil spills are known to have occurred in the early 1990s. In each case, however, the spills were contained within the concrete structure.

1.2.4.19 Building 311

Building 311, a large high-bay warehouse and machine shop with overhead cranes, is constructed of concrete and steel, faced with brick. The first section of the building was built in 1917 for the erection of disappearing, barbette, and railway carriages for guns. The building has had several additions and renovations and currently measures 180 ft by 950 ft.

The building has housed numerous manufacturing operations, including cold-working of guns and gun carriages, various machine shops, induction crucible furnaces, and other associated armaments research and manufacturing operations.

Recent operations included various research laboratories, an industrial X-ray facility, a detonic facility, machine shop operations, a pultrusion facility, a fiber composite lab, DU storage areas, materials receiving and warehousing areas, hazardous materials/waste storage areas, and administrative offices.

Building 311 formerly housed a radioactive materials storage area. Radioactive materials and other products were stored in metal drums in a fenced-in, open-top storage area segregated into two distinct storage compartments. A DU machine shop was once located on an area covered with steel plates in the east/central portion of the building. This was located about 100 ft from the location of the DU storage cage. DU was also stored in the DU vault and temporarily in the shipping area in the eastern part of the building. Machining operations performed on DU in this building ceased as of 1991.

Radiological remediation of Building 311, including scabbling, floor tile removal, and drainline removal was completed in November 1994. The current NRC status of Building 311 is pending review of the remediation report and final termination surveys by NRC.

1.2.4.20 Building 312

Building 312 is a high-bay brick and steel building that has three floors and was built in 1894. The building has undergone several renovations and additions and currently measures approximately 80 ft by 280 ft. It was originally built to house an erecting shop for assembling gun carriages. Additional operations that were performed in this building included a machine tool shop, an electroplating shop, a crystal growth laboratory, a shock wave physics laboratory, ballistics ranges, a mechanical equipment loft, several offices, and a laser laboratory. A section of the first floor of this building was previously used to house beryllium and DU machining operations. Activities using radioactive materials in this building are believed to have begun in 1963 when the DU machine shop was transferred from Building 421. A 1965 NRC inspection report states that DU melting and machining were being done in Building 312. It reports contamination levels of 50 to 500 dpm/100 cm^2 beta-gamma and 20 to 300 dpm/100 cm^2 alpha. The rooms that contained the DU and beryllium machine shops were constructed in 1963. Reportedly, the north part of the building continued to have a dirt floor and DU chips were stored in barrels on the floor.

Recent operations include machining DU in the south end of the first floor in the areas known as the DU and beryllium machine shops. Operations included turning, cutting,

grinding, and drilling. There is also a plate shop on the first floor where DU metal was cleaned and plated. In the plate shop, small DU pieces were cleaned in buckets of nitric or hydrochloric acid or alkali. They then underwent electrochemical plating with nickel and cadmium. All work was done in an area with a concrete curb and no drain (MTL employee, 1991).

A vacuum exhaust system was installed to collect dust and particles generated by the DU and beryllium machining operations. This vacuum exhaust system is located on the third floor of Building 312 and consists of a roof stack, associated ductwork, blowers, filters, and cyclone separators.

There are currently no operations involving DU being performed in the remainder of the building. Before decommissioning operations took place in 1993/1994, the DU and beryllium machining areas had consisted of a series of small rooms (Rooms 101 through 130) with painted plaster walls and ceilings and a concrete floor covered with asphalt tile. The rooms contained various machine tools, glove boxes, sinks, and other equipment. As of the writing of this FS, all heavy maching equipment has been removed, and the floors, walls and ceilings have been remediated for radiological parameters as part of an NRC decommissioning/license termination. The plating shop is a room with a 20-ft ceiling, painted brick walls, and a concrete floor. The room contained electroplating tanks in an area with a concrete curb.

Radiological remediation of Building 312, including floor, ceiling, and trench cleaning, floor tile removal, and drainline removal was completed in September 1993. The current NRC status of Building 312 is pending review of the remediation report by NRC.

1.2.4.21 <u>Building 313</u>

Building 313 has two stories and a basement and was constructed in 1862 in the shape of a capital E. The building was initially used as a carriage and machine shop for gun carriage fabrication and also as a powerhouse for adjacent buildings (43 and 37). The south end of

the building was also previously used as a woodworking shop. The building has had several renovations, including a second-story addition to the center wing in 1942, and currently measures 180 ft by 300 ft.

Until 1995, the building housed ballistics ranges, several research laboratories, and administrative offices. The south wing of the building contained an experimental foundry, a ceramic research and fabrication area, and a clean dry laboratory. The center wing contained a welding laboratory, the nondestructive examination (NDE) school, and associated NDE laboratories. This wing contains an abandoned cistern, located beneath the western portion of the wing, and measuring approximately 75 ft by 25 ft by 20 ft deep. The first and second floors of the north wing of the building houses the installation security offices. Also, general research laboratories, a ceramic laboratory, and other administrative offices were located there. Ballistics ranges were also located in the northeast section of the basement of this wing.

Pieces of DU were taken to Building 313, where various experiments or tests were conducted. Ballistics testing may have been performed in the building as well. Room 150A, in the center wing, was used for DU storage. There was no other known use of DU in this building.

Radiological decontamination of the cistern beneath Building 313, including the cistern floor, ceiling, and walls, was completed in October 1993. The NRC status for the cistern is pending NRC confirmation surveys.

1.2.4.22 Structures 652 and 654

These two structures are pump houses located on the southern fence line of the facility just south of Structure 295. The construction dates of the pump houses are unknown. The structures contained equipment that was used to pump water from the Charles River for use in the fire protection system. The equipment was abandoned in place when the fire water system was converted to use the municipal water supply.

1.2.4.23 Building 656

Building 656 is a 40-ft-by-30-ft single-story brick building built during the early 1960s. It contained operational cooling equipment that provided conditioned air and chilled water for Building 39. It was also used for storage of cooling equipment.

1.2.5 Contaminant Fate and Transport

The contaminants that were found indoors at MTL have a low potential to migrate outside the buildings. The indoor contamination is likely to be surface contamination on building interiors, or, at most, contamination that may have penetrated a short distance into the building materials, such as concrete or into cracks in the floor. It is unlikely that the contaminants will be able to migrate into the ground and surface waters, soils, or outdoor air under the present conditions. It is possible that contaminants could migrate if the buildings were demolished and no precautions were taken to protect the environment. Contaminants could also be spread by personnel traffic in the buildings.

Containers and tanks do have the potential to impact the environment if they are leaking. To reduce the risk of leakage, MTL has a leak-test program. Many of the underground storage tanks have been removed and remedial action has been taken to clean up environmental contamination.

The indoor air sampling program indicated that indoor air quality is currently acceptable. Because the indoor surfaces have been determined to be contaminated, future activities in the building could result in an increase in indoor air contamination levels. Since most of the contaminants are stable compounds such as metals, the potential for an increase in air contamination levels will continue to be present over the long term. However, the surface contamination is not an immediate threat because it is not easily resuspended. Air monitoring and the use of precautions during remediation will limit the potential to affect worker health and safety during remediation activities.

SECTION 2

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

2.1 INTRODUCTION

The Massachusetts Department of Environmental Protection (MADEP) regulations regarding identification, evaluation, and selection of comprehensive remedial action alternatives (Phase III) are contained in 310 CMR 40.0850-40.0869. According to 40 CMR 40.0858, the following criteria are to be used in the detailed evaluation of remedial alternatives:

- Comparative effectiveness of the alternatives.
- Comparative short- and long-term reliability of the alternatives.
- Comparative difficulty in implementing each alternative.
- Comparative costs of the alternatives.
- Comparative risks of the alternatives.
- Comparative benefits of the alternatives.
- Comparative timeliness of the alternatives in terms of eliminating uncontrolled sources of oil and/or hazardous material and achieving a level of No Significant Risk, per 310 CMR 40.0900.
- The relative effect of alternatives upon nonpecuniary interests, such as aesthetic values.

These criteria are discussed in greater detail in Section 5. The purpose of this section is to provide the necessary background information for later discussion of the third criteria listed—comparative difficulty in implementing each alternative. According to MADEP regulations, an integral consideration for this criterion is the ability of each alternative to meet regulatory requirements for approvals, permits, or licenses required by MADEP, or other state, federal, or local agencies.

To date, site characterization studies and remedial alternative evaluations for the MTL site have been conducted according to National Contingency Plan (NCP) protocols [including the draft version of this document, entitled Phase 2 Feasibility Study Report Army Materials Technology Laboratory (WESTON, November 1992)]. However, all studies/evaluations conducted to date have also met the substantive requirements of the MCP, many of which are analogous to NCP requirements. The outdoor portion of the MTL was placed on EPA's National Priorities List (NPL) on 30 May 1994. However, the indoor portion of the site is being addressed under the auspices of the MCP. For ease of discussion, comparison with other MTL documents, and for a smoother transition between this document and the draft version, the MCP regulatory requirement evaluation, as part of the remedial alternatives comparison criterion for implementability described in the preceding paragraph, is discussed below using NCP terminology.

According to the NCP document "Guidance for Conducting Remedial Investigation/ Feasibility Studies (RI/FS) Under CERCLA," one of the nine criteria used in the detailed evaluation of remedial alternatives is comparison with Applicable and/or Relevant and Appropriate Requirements (ARARs).

ARARs are defined as follows:

- Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

- Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site.

ARARs may be divided into the following categories:

- Chemical-specific requirements are health- or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or contaminants. These limits may take the form of cleanup levels or discharge levels.

- Location-specific requirements are restrictions on activities that are based on the characteristics of a site or its immediate environment. An example would be restrictions on wetlands development.

- Action-specific requirements are controls or restrictions on particular types of activities in related areas such as hazardous waste management or wastewater treatment. An example would be Resource Conservation and Recovery Act (RCRA) incineration standards.

Table 2-1 presents a list of the chemical, location, and action-specific ARARs for the MTL indoor areas.

2.2 CHEMICAL-SPECIFIC ARARs FOR THE MTL INDOOR AREAS

Each of the chemical-specific ARARs for the MTL indoor areas (see Table 2-1) is discussed below.

2.2.1 Massachusetts Hazardous Waste Management Rules (310 CMR 30) and RCRA Requirements (40 CFR 261-268)

RCRA requirements become applicable to the MTL indoor areas when chemically contaminated materials found in these areas are remediated. The waste materials generated as a result of remediation could be classified as RCRA hazardous wastes (either listed or characteristic hazardous waste).

Regulations promulgated under RCRA define hazardous wastes and generally establish technology-based requirements for active or proposed hazardous waste facilities. In the case of the MTL indoor areas, RCRA applies to disposal of hazardous waste during remediation.

The Massachusetts Hazardous Waste Regulations (310 CMR 30) are virtually equivalent to the RCRA regulations. The notable exception is that oil and PCBs are classified as

Table 2-1

Summary of ARARs for the MTL Indoor Areas

Chemical-Specific ARARS Massachusetts Hazardous Waste Regulations Resource Conservation and Recovery Act (RCRA) State and Federal Air Quality Standards
Location-Specific ARARs Massachusetts Lead Law Federal Residential Lead-Based Paint Hazard Reduction Act of 1992 National Historic Preservation Site
Action-Specific ARARs Resource Conservation and Recovery Act (RCRA) Occupational Health and Safety Act (OSHA) Clean Air Act Commonwealth of Massachusetts Regulations

hazardous substances in Massachusetts, with waste oil constituting a hazardous waste (except when the waste oil is also radioactive, in which case it is not a hazardous waste). In addition, wastes containing PCBs above a concentration of 50 ppm are state hazardous wastes.

2.2.2 State and National Air Quality Standards

Standards exist for two of the materials found in air in MTL buildings (lead and particulates). The Massachusetts Ambient Air Quality Standards (310 CMR 6.0) and the National Ambient Air Quality Standards (NAAQS) (40 CFR 50) may be applicable if the site has the potential for airborne discharges. The standard for lead is 1.5 $\mu g/m^3$ within a calendar quarter. The standard for particulates (particle mass $<$10 microns, i.e., PM-10) is 50 $\mu g/m^3$ within a calendar year and 150 $\mu g/m^3$ within a 24-hour period. These standards were not exceeded during Phase 2 RI air sampling.

The Massachusetts Air Pollution Control Regulations (310 CMR 7.0) contain notification requirements when buildings that contain asbestos are demolished or renovated.

Other potential ARARs include occupational exposure standards and guidelines for airborne contaminants. Enforceable federal regulatory standards include the Permissible Exposure Levels (PELs) from the Occupational Health and Safety Administration (OSHA). Known PELs are listed in Appendix C. In addition to the enforceable PELs, recommended occupational exposure guidelines are also relevant and appropriate. These guidelines include the Threshold Limit Values (TLVs) from the American Conference of Governmental Industrial Hygienists (ACGIH), and the Recommended Exposure Levels (RELs) from the National Institute for Occupational Safety and Health (NIOSH). These guidelines are also listed in Appendix C.

It is important to distinguish the significant differences between establishing exposure levels for the general public and using the occupational exposure standards and guidelines. Current public health standards/guidelines, including those from EPA (NAAQS), the World

Health Organization (WHO), and the American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE), are generally one to two orders of magnitude lower (more protective) than the occupational exposure standards for short- and long-term exposure limits. Several factors account for these variations:

- Occupational standards do not include protection for the old, the young, pregnant women, people with preexisting respiratory ailments, and other sensitive individuals in the population; they typically presume a healthy adult workforce and may explicitly accept that a very small percentage of the workforce will experience adverse health effects at the occupational exposure limits.
- Occupational exposure limits assume exposure periods of no more than 8 hours a day, 40 hours a week.
- Occupational limits are established in consideration of the technical and economic feasibility of their implementation; they are not based solely on established health criteria.
- Implicit in occupational standards is the assumption that exposure is voluntary (inherent in the chosen occupation).

Known WHO and ASHRAE guidelines are also listed in Appendix C, and are considered to be relevant and appropriate. There are fewer contaminants covered under WHO and ASHRAE guidelines than under the occupational health guidelines. None of the air quality standards were exceeded during Phase 2 RI air sampling.

2.3 LOCATION-SPECIFIC ARARs FOR MTL INDOOR AREAS

2.3.1 Massachusetts Lead Law

In 1971, Massachusetts General Laws (MGL) Chapter 111, Sections 190-199 created the Childhood Lead Poisoning Prevention Program (CLPPP). The Lead Law, as amended by Chapter 482 of the Acts of 1993, and as interpreted and implemented by the Massachusetts Lead Poisoning Regulations— 105 CMR 460.000, expressly forbids the use of lead-based paint or glaze on inside or outside surfaces of any dwelling. The law is administered by the Massachusetts Department of Public Health, together with local boards of health. Under

the Lead Law the CLPPP and local boards of health are not required to do inspections for property transfers. Regulation 105 CMR 460.100 states that the owner of a residential premises must abate/contain accessible structural material containing dangerous levels of lead, as defined in 105 CMR 460.020, when one of the following occurs:

- A child under six years of age resides in the premises, or
- The premises undergoes a change of ownership, which will result in a child under six years of age residing on the premises.

2.3.2 Federal Residential Lead-Based Paint Hazard Reduction Act of 1992

Because the MTL property was transferred in September 1995, the federal regulation driving the Army's lead-based paint program at the facility is Title X of the Lead-Based Paint Hazard Reduction Act of 1992 (42 USCS @@ 4851 et seq. and 15 USCS @@ 2861 et seq.). One of the many purposes of this Act is to reduce the threat of childhood lead poisoning in housing owned, assisted, or transferred by the Federal Government.

Section 4852c of the Act provides for the issuance of guidelines for the conduct of all federally supported work involving risk assessments, inspections, interim controls, and abatement of lead-based paint hazards.

Because all of the on-site MTL buildings were constructed prior to 1980, when the Army was still in possession of lead-based paint supplies, it is likely that all of the buildings contain some lead-based paint. For any lead-based paint removal planning and operations, all efforts will be in compliance with the substantive requirements of the Lead-Based Paint Hazard Reduction Act.

2.3.3 National Historic Preservation Act of 1966

Under Section 106 of the National Historic Preservation Act of 1966, as amended, 16 USC 470 et seq., and Executive Order 11593, if an action affects any property with historic,

archeological, or cultural value that is listed on or eligible for listing on the National Register of Historic Places, the responsible official shall comply with the procedures for consultation and comment promulgated by the Advisory Council on Historic Preservation in 36 CFR 800.

Under the Archeological Preservation Act of 1974, 16 USC 469 et seq., and Executive Order 11593, if an action may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archeological data, data recovery and preservation activities shall be conducted in accordance with implementing procedures promulgated by the Secretary of Interior.

In accordance with the above Act, the Army signed a Memorandum of Agreement that stipulated certain requirements on any work done at the site, including the need to inform personnel of the need to exercise care when working in areas identified as being possibly archeologically sensitive. If this RAP includes a recommendation to demolish or substantially alter any character-defining attributes of the site, the Army, the Advisory Council on Historic Preservation, and the Massachusetts State Historic Preservation Officer will be consulted to determine what can be done to preserve such attributes.

2.4 ACTION-SPECIFIC ARARs FOR MTL INDOOR AREAS

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to site remediation. These requirements are triggered by the particular activities that are selected to accomplish the cleanup. Since there are usually several alternative actions for any remedial site, very different potential requirements can come into play. These action-specific requirements do not in themselves determine which remedial alternative is selected; rather they indicate how a selected alternative must be implemented.

Each of the action-specific ARARs for the MTL indoor areas (see Table 2-1) is discussed in the following subsections.

2.4.1 Resource Conservation and Recovery Act (RCRA)

2.4.1.1 Land Disposal Restrictions (LDRs)

Land disposal is defined to include any placement of a RCRA hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome or salt bed formation, or underground mine or cave; therefore, RCRA LDRs would apply at MTL if hazardous waste were removed and placed outside of the current area of contamination; removed, treated, and placed back in the original area of contamination; or removed and shipped to an off-site TSDF. At this time, it has not been concluded that RCRA hazardous wastes are present on-site, but the possibility does exist; therefore, LDRs are considered potential ARARs.

Land disposal of a RCRA hazardous waste is regulated under 40 CFR 268. EPA must promulgate treatment standards for all hazardous wastes. Established treatment standards are presented under Subpart D of 40 CFR 268. Wastes that meet these treatment standards may be directly land-disposed. Wastes that do not meet these standards must be treated to meet the corresponding standard before they are placed in a land disposal unit. The treatment standards are expressed as either:

- A concentration level to be achieved (performance based) using any available technology to meet the standard.
- A specified Best Demonstrated Available Technology (BDAT) that must be used (technology based).

Hazardous wastes that do not meet the treatment standards are prohibited from land disposal under Subpart C of 40 CFR 268. Furthermore, under Subpart E of 40 CFR 268, the following prohibitions are placed on storage of such restricted wastes:

- Generators may store such wastes in tanks or containers on-site solely to accumulate such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal.

- TSDFs may store such wastes in tanks or containers solely to accumulate such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal.

Based on standards promulgated for other characteristic wastes (40 CFR 268.40 to 268.44), including the former Extraction Procedure (EP) toxic waste category, the expected treatment standard is at the threshold level that caused the waste to be listed as a characteristic hazard [in this case, the Toxicity Characteristic (TC) value]. For example, the treatment standard to be met to allow land disposal of a TC benzene waste is 0.5 mg/L based on TCLP testing.

When promulgating the LDR treatment standards, EPA recognized that treatment of wastes to the LDR treatment standards would not always be possible or appropriate; therefore, a treatability variance process has been established to comply with the LDRs when a CERCLA waste differs significantly from the waste used to set the LDR standards. The LDRs provide four options for complying with LDRs: treatability variance, equivalent treatment method petition, no migration petition, and delisting.

2.4.1.2 Landfilling

As previously noted, RCRA applies to hazardous waste activities conducted after the effective date of RCRA regulations. As such, RCRA landfill requirements do not apply to facilities closed prior to the enactment of RCRA; however, any RCRA hazardous waste removed and subsequently landfilled as a RCRA hazardous waste is subject to RCRA landfilling regulations and LDRs. Landfilling of a RCRA hazardous waste is regulated under 40 CFR 264 and 265, Subpart N. These regulations include provisions for the design, operation, monitoring, inspection, and closure of hazardous waste landfills. Specific performance standards are presented for liners and leachate collection systems.

In addition to the Subpart N requirements, a groundwater monitoring program to detect potential releases from landfills is specified under 40 CFR 264.91 to 264.100 and 265.91 to 265.94.

2.4.1.3 TSDF Requirements

TSDF requirements under RCRA apply to facilities that treat, store (for greater than 90 days), or dispose of RCRA hazardous wastes. TSDF requirements (40 CFR 264 and 265) are potential ARARs relevant to MTL for remedial actions involving TSDF activities with on-site materials qualifying as RCRA hazardous wastes. Specific requirements include:

- General facility standards (Subpart B).
- Preparedness and prevention standards (Subpart C).
- Contingency plan and emergency procedures (Subpart D).
- Manifest system, recordkeeping, and reporting (Subpart E).
- Groundwater monitoring (Subpart F).
- Closure and post-closure requirements (Subpart G).
- Use and management of containers (Subpart I).
- Provisions for tank systems; waste piles; land treatment; landfills; incinerators; thermal treatment; and chemical, physical, and biological treatment (Subparts J, L, M, N, O, P, and Q, respectively).

2.4.1.4 Generator Requirements

Generator requirements under RCRA apply to individuals who generate hazardous wastes. Generator requirements (40 CFR 262) are potential ARARs at MTL for remedial actions that generate residues determined to be hazardous wastes. General provisions include:

- Hazardous waste determinations and EPA identification numbers (Subpart A).
- Manifesting requirements (Subpart B).
- Pretransport requirements (Subpart C).
- Recordkeeping and reporting (Subpart D).
- Exports of hazardous waste (Subpart E).

2.4.1.5 Use And Management Of Containers

40 CFR 264 and 265, Subpart I, apply to owners and operators of all hazardous waste facilities that store containers of hazardous waste. Since remedial actions at MTL will likely require the use of containers for handling field-generated hazardous waste, the following subsections would apply:

- Management of containers (40 CFR 264.173 and 265.173).
- Compatibility of waste with containers (40 CFR 264.172 and 265.172).
- Inspections (40 CFR 264.174 and 265.174).
- Containment (40 CFR 264.175 and 265.175).
- Closure (40 CFR 264.178).

2.4.2 Occupational Safety And Health Act

The Occupational Safety and Health Act (29 USC 651) resulted in the creation of the Occupational Safety and Health Administration (OSHA) to protect worker safety and to administer regulatory control for worker safety.

Under the Act, general industry standards have been promulgated under 29 CFR 1910. The action-specific requirements given under 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, specifically apply to MTL. While OSHA is not an ARAR for this site, the requirements still must be met.

2.4.3 Clean Air Act (CAA)

The CAA (42 USC 7401 et seq.) mandates EPA to establish regulations to protect ambient air quality. As such, it may be applied as an ARAR to MTL for remedial actions that potentially result in air emissions.

Under the CAA, three areas were identified for regulation:

- Establishment of National Ambient Air Quality Standards (NAAQS).

- Establishment of maximum emission standards as expressed under the National Emission Standards for Hazardous Air Pollutants (NESHAPs).

- Establishment of maximum emission standards as expressed under the New Source Performance Standards (NSPSs).

NAAQS and NESHAPs represent chemical-specific requirements (see Subsection 2.2.2). The NSPSs contains action-specific requirements.

The CAA was amended in 1990; however, most of the final rules to support this amendment have not yet been issued. It is expected that the new rules will include expanded permit requirements and Maximum Available Control Technologies (MACTs) for hazardous waste facilities.

2.4.4 Commonwealth of Massachusetts Regulations

2.4.4.1 Hazardous Waste Regulations

Massachusetts hazardous waste regulations are presented in 310 CMR 30. These are very similar to RCRA in certain areas. They include more detail on the recycling of hazardous waste (310 CMR 30.200), but contain less detail than 40 CFR Parts 264 and 265 on treatment of hazardous waste. Areas of these regulations that are equivalent to RCRA include:

- Landfilling - 310 CMR 30.620.
- Capping - 310 CMR 30.620.
- TSDFs - 310 CMR 30.600.
- Generator Requirements - 310 CMR 30.300.
- Waste Piles - 310 CMR 30.640.
- Use and Management of Containers - 310 CMR 30.680.

These regulations may be applicable or relevant and appropriate for remedial activities at MTL. Any activity involving handling or moving a waste or soil and debris determined to be hazardous under RCRA or Commonwealth of Massachusetts regulations may involve these rules.

2.4.4.2 Solid Waste Requirements

Massachusetts requirements for solid waste management are contained in 310 CMR 19. These provisions establish standards applicable to the treatment, storage, and disposal of solid waste and the closure of solid waste facilities. Nonhazardous solid waste on-site must be managed, stored, treated, and disposed of in accordance with the solid waste management rules.

A specific part of these rules that may be applicable to MTL are the rules for the handling of Special Waste. Special Waste is defined as nonhazardous waste that requires controls to prevent an adverse impact to human health or the environment from its collection, transportation, treatment, storage, or disposal. Any nonhazardous excavated soil or treatment sludges or residues may be deemed as Special Wastes. The on-site management of Special Wastes will require approval from MADEP, and the wastes must be managed in accordance with the regulations.

2.4.4.3 Air Emissions

Massachusetts air regulations are contained in 310 CMR 6-8. These regulations outline ambient air quality standards and air pollution control regulations. They include requirements for emission limitations, design specifications, and permitting. These regulations would be applicable at MTL for any emissions resulting from remedial actions. Specific sections of the regulations that may be applicable include:

- Visible emissions - 310 CMR 7.06.
- Incinerators - 310 CMR 7.08.
- Dust, Odor, Construction, and Demolition - 310 CMR 7.09.
- Noise - 310 CMR 7.10.
- Volatile Organic Compounds (VOCs) - 310 CMR 7.18.

2.4.4.4 Discharge of Treatment System Effluent

If liquid waste is generated during cleanup in MTL buildings it will need to meet the following requirements. Treatment residues of listed hazardous wastes must be managed as a hazardous waste in accordance with 310 CMR 30 and 40 CFR 260-268. Potential discharge of nonhazardous waste water to the sanitary sewer must meet the permitting, monitoring, and discharge limit requirements of the Massachusetts Water Resources Authority (MWRA) Sewer Use Rules and Regulations 360 CMR 10. MTL has a discharge permit issued by the MWRA. However, the permit limits may be exceeded by liquid waste generated during decontamination. Therefore, an additional permit or permit modification may be required. MWRA will require a waste characterization of the water before determining whether the discharge would be prohibited or allowed under a permit modification. On-site pretreatment may be needed prior to sewer discharge.

The existing permit covers the following topics:

- Discharge limitations.
- Reporting requirements.
- Sampling requirements.
- Volume limitations.

2.4.4.5 Release of Oil and Hazardous Materials

The MCP contains requirements for notification of the State if oil and hazardous materials are released to the environment (310 CMR 40.300). This requirement is subject to certain exclusions pertaining to specific materials and quantities. The list of oil and hazardous materials and the quantities below which notification is not required are contained in 310 CMR 40.1600.

SECTION 3

IDENTIFICATION AND SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND TECHNOLOGY PROCESS OPTIONS

3.1 INTRODUCTION

The objective of this report is to identify the most appropriate solutions for site remediation of indoor areas. Remedial technologies that reduce the toxicity, mobility, or volume of wastes and contaminated materials will be emphasized. A remedy will be selected that uses permanent solutions and treatment technologies to the maximum extent practical.

This section presents the following steps:

- Establishment of remedial action objectives.
- Development of general response actions for which actions may be applied.
- Identification and screening of potential technologies and process options based on technical implementability.

Within this section, Subsection 3.2 presents the remedial objectives. The response actions and associated remedial technologies and process options are identified in Subsection 3.3. In Subsection 3.4, the technologies and process options applicable to each response action are screened. Subsection 3.5 presents a summary of the screening process.

3.2 REMEDIAL OBJECTIVES

Based on the results of the RI and risk assessment, remedial action objectives for MTL indoor media are developed in this subsection.

3.2.1 Development of Remedial Action Criteria

Subsection 1.2.3 summarizes the findings of the Phase 2 RI and building risk assessment. Building surface cleanup goals based on the risk assessment (RA) and site background levels are developed in Subsection 1.2.3.3 and are summarized in Table 3-1. Cleanup goals have been established to remediate the building surfaces to a level consistent with background or to a level of no significant risks for both residential reuse and commercial reuse. In addition to remediating surfaces to a level of no significant risk, the level of contamination will be reduced to background levels, where feasible. The feasibility of achieving background will be included in the Remedial Implementation Plan.

Using these cleanup goals, building surface areas were identified that were above a level of no significant risk. These areas are summarized in Tables 1-1 and 1-2. An estimate of areas is required for preparing cost estimates in this report. For the purpose of estimates, if a particular building surface (i.e., wall, floor) was found to have at least one contaminant present above the cleanup goal, the entire surface area was included in the estimate for total areas to be remediated.

Surface areas for cleanup were estimated for each of three possible site reuse scenarios based on commercial and residential reuse for the four zones at MTL as defined by the Watertown Arsenal Reuse Committee. The site reuse scenarios are as follows:

Scenario 1 — Commercial reuse for Zones 1, 2, and 3, public access for Zone 4 and River Park.

Scenario 2 — Residential reuse for Zones 1, 2, and 3, public access for Zone 4 and River Park.

Scenario 3 — Commercial reuse for Zones 1 and 2, residential reuse for Zone 3, and public access for Zone 4 and River Park.

Table 3-2 provides an identification of the buildings that are contained within each zone. Table 3-3 provides a summary of the total estimated surface areas identified for cleanup for each of the three site reuse scenarios.

Table 3-1
MTL Building Interior Surface Levels of No Significant Risk Summary (mg/m^2)

Chemical	Comparison Levels for Commercial Reuse (mg/m^2)	Comparison Levels for Residential Reuse (mg/m^2)
Acenaphthene	6100[1]	110[1]
Acenaphthylene	4100[1,2]	44[2]
Aldrin	.077[3]	.0054[3]
Alpha-Endosulfan	2.6[1]	.084[1]
Anthracene	31000[1]	530[1]
Antimony	21[1,2]	.43[2]
Arsenic	.59[3]	.046[3]
Barium	18.9[4]	3.6[1]
Benzo (a) anthracene	.39[3]	.014[3]
Benzo (a) pyrene	.39[3]	.014[3]
Benzo (b) fluoranthene	.39[3]	.014[3]
Benzo (g,h,i) perylene	4100[1,2]	44[2]
Benzo (k) fluoranthene	.39[3]	.014[3]
Beryllium	.031[3]	.0081[3]
Beta-Endosulfan	2.6[1]	.084[1]
Bis (2-ethylhexyl) phthalate	200[3]	9.9[4]
Butylbenzyl phthalate	20000[1]	350[1]
Cadmium	2.4[3]	.57[3]
Chromium	.928[4]	.23[4]
Chrysene	.39[3]	.014[3]
Cyanide (free)	72[2]	7[2]
DDD	6[3]	.39[3]
DDE	4.2[3]	.28[3]
DDT	3.8[3]	.27[3]
Di-N-butyl phthalate	10000[1]	180[1]
Di-N-octyl phthalate	2000[1,2]	22[2]
Dibenz (a,h) anthracene	.39[3]	.014[3]

Note: Chromium is assumed to be Chromium VI for risk assessment

Table 3-1
MTL Building Interior Surface Levels of No Significant Risk Summary (mg/m^2) (continued)

Chemical	Comparison Levels for Commercial Reuse (mg/m^2)	Comparison Levels for Residential Reuse (mg/m^2)
Dieldrin	.081[3]	.0057[3]
Dinitrotoluene	1.5[3]	.3[3]
Endrin	16[1,2]	.32[2]
Fluoranthene	4100[1,2]	44[2]
Fluorene	4100[1]	70[1]
Heptachlor	.29[3]	.02[3]
Heptachlor epoxide	.14[3]	.01[3]
Lead and compounds	2.98[4]	38.9[4]
Lindane	1.1[3]	.072[3]
Mercury, inorganic	5.3[1,2]	.29[2]
Methoxychlor	.26[3]	.011[3]
Methylnaphthalene, 2-	4100[1,2]	44[2]
Naphthalene	4100[1,2]	44[2]
Nickel	18[3]	4.1[3]
Nitrate/Nitrite	9300[1,2]	110[2]
PCB 1254	.051[3]	.0084[3]
PCB 1260	.051[3]	.0084[3]
Phenanthrene	3100[1]	53[1]
Pyrene	3100[1]	53[1]
RDX	1.5[3]	.26[3]
Silver	26[1,2]	3.4[2]
Vanadium	68[1,2]	5.9[2]

Basis for Comparison Level:
[1] Non-carcinogenic Chronic
[2] Non-carcinogenic Sub-Chronic
[3] Carcinogenic
[4] Background

Table 3-2

MTL Buildings Contained in Site Zones

Zone	MTL Buildings
Zone 1	Building 243
Zone 2	Building 36 Building 39 Building 43 Building 60 Building 97 Building 117 Building 118 Building 292 Building 311 Building 312
Zone 3	Building 37 Building 131 Building 313
Zone 4	Building 111 Building 244 Building 245

Table 3-3

Summary of Areas Requiring Remediation for Each Reuse Scenario

Site Reuse Scenario	MTL Buildings	Surface Area to be Remediated (sq ft)
Scenario 1 - Commercial Reuse	Building 36	15,190
	Building 37	30,700
	Building 39	36,085
	Building 60	8,300
	Building 97	9,100
	Building 111	7,500
	Building 117	2,500
	Building 118	170
	Building 131	2,520
	Building 243	3,500
	Building 244/245	1,500
	Building 292	32,820
	Building 311	74,110
	Building 312	10,050
	Building 313	64,895
		Total - 298,940[1]
Scenario 2 - Residential Reuse	Building 36	23,590
	Building 37	34,550
	Building 39	45,960
	Building 60	8,300
	Building 97	10,590
	Building 111	7,500
	Building 117	2,500
	Building 118	170
	Building 131	2,520
	Building 243	4,500
	Building 244/245	3,000
	Building 292	35,970
	Building 311	76,335
	Building 312	11,660
	Building 313	69,825
		Total - 336,970[2]

Table 3-3

Summary of Areas Requiring Remediation for Each Reuse Scenario (Continued)

Site Reuse Scenario	MTL Buildings	Surface Area to be Remediated (sq ft)
Scenario 3 - Commercial Reuse for Zones 1 and 2, Residential Reuse for Zone 3, and Public Access for Zone 4	Building 36	15,190
	Building 37	34,550
	Building 39	36,085
	Building 60	8,300
	Building 97	9,100
	Building 111	7,500
	Building 117	2,500
	Building 118	170
	Building 131	2,520
	Building 243	3,500
	Building 244/245	3,000
	Building 292	32,820
	Building 311	74,110
	Building 312	10,050
	Building 313	69,825
		Total - 309,220[3]

NOTES:

Areas for Building 43 are not included. Confirmatory sampling may indicate that chemical contamination was removed during radiological decontamination activities. As a result, the building would not require any further decontamination activities.

[1] For Reuse Scenario 1, an additional 84,910 sq ft identified that previously was decontaminated for radiological parameters.

[2] For Reuse Scenario 2, an additional 88,745 sq ft identified that previously was decontaminated for radiological parameters.

[3] For Reuse Scenario 3, an additional 84,910 sq ft identified that previously was decontaminated for radiological parameters.

3.2.2 Remedial Action Objectives

The remedial action objectives for indoor areas at MTL are as follows:

- Prevent direct contact with structures or dust and debris exhibiting contamination at levels that pose unacceptable carcinogenic or noncarcinogenic health risks or are in excess of cleanup levels established in Section 1.
- Prevent migration of contamination from indoor areas to other areas at MTL or to off-site areas.

3.3 GENERAL RESPONSE ACTIONS

General response actions have been identified for the indoor areas at MTL based on the information and data presented in the Phase 1 and Phase 2 RI Reports. General response actions describe those actions that will satisfy the remedial action objectives. These general response actions include:

- No action/institutional controls.
- Demolition.
- Treatment.

These response actions and the associated remedial technologies and process options are presented in Table 3-4. The term "remedial technology" refers to the general categories of technologies. The term "process option" refers to the specific processes within each technology type. Several broad technology types may be identified for each general response action, and numerous technology process options may exist within each technology type. Each option is discussed and screened separately in Subsection 3.4.

3.4 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES

In this screening step, the universe of potentially applicable technology types and process options has been reduced by evaluating the process and options with respect to technical

Table 3-4

U.S. Army Materials Technology Laboratory
Preliminary List of Remedial Technologies and Process Options

Response Action	Remedial Technology	Process Options
No Action	None	None
Institutional Actions	Access Restrictions	Post site areas and install fences; restrict land use
	Monitoring	Air monitoring
Demolition	Demolition	Demolition of on-site buildings and structures
	Dismantling/Removal of Particulars	Dismantling/removal of building particulars
Treatment	Physical Treatment	Encapsulation; steam cleaning; grit blasting; strippable coatings; fixative/stabilizer coatings; dusting/vacuuming/wiping; hydroblasting/water washing; scarification; flaming; drilling and spalling
	Chemical Treatment	Solvent washing; vapor phase solvent extraction; fluorocarbon extraction; alkali or acid etching; bleaching; photochemical degradation
	Biological Treatment	Microbial degradation

implementability. Remedial technologies and process options were evaluated for their technical feasibility based on site and waste characteristics and applicability to the identified problem areas on the site. Remedial technologies and process options were identified and screened using the following process:

- The technology process option was described along with a discussion of its potential application.
- The technical reliability (technology development, performance, and safety) and implementability of the process option to site and waste characteristics was evaluated.
- A recommendation was then made to retain or eliminate the process option from further consideration based on the criteria previously described.

3.4.1 No Action

Under the no action option, no remedial measures would be taken to decontaminate indoor areas at MTL. This would not achieve remedial action objectives or reduce potential health risks. The no action approach would not affect the historical significance of any buildings.

Recommendation - The no action option will be considered further. It will serve as a baseline comparison for other options.

3.4.2 Institutional Actions

Institutional actions to be considered for this site include restricting access to contaminated indoor areas, restricting land use, and monitoring indoor areas. Access restrictions include closing and locking the buildings to prevent access, and installing fences around contaminated areas or posting signs around contaminated areas for upgraded security. Also the land use can be restricted by placing restrictions on property deeds in the contaminated areas. These measures would attempt to control exposure to contamination. In addition, monitoring indoor areas can detect any spread of contamination as well as the exposure levels in the indoor areas.

Institutional actions do not involve remediation of contamination but will achieve the remedial action objectives. However, anyone entering the contaminated indoor areas would be subject to potential exposure from contaminants.

Recommendation - Since this option meets the remedial action objectives, it will be retained for further consideration.

3.4.3 Demolition of On-Site Buildings

Demolition is a technique that involves total destruction of a building or structure. However, some of the debris resulting from the demolition of a contaminated building or structure may be contaminated and could require handling as a hazardous waste. Demolition techniques include complete burndowns, controlled blasting, wrecking with balls or backhoe-mounted rams, rock splitting, drilling, and crushing. This technique can be applied to all buildings or only to select buildings.

Demolition would achieve the remedial action objectives but may not be able to be implemented on buildings that have historical significance. For such buildings, partial demolition can be performed as long as a historically significant portion remains. Demolition generates large quantities of waste. Demolition would be a successful remedial action regardless of the types of contaminants. Personnel protection would be required to minimize exposure to airborne contamination during demolition.

Recommendation - This option will be retained for further consideration because it meets the remedial action objectives.

3.4.4 Dismantling/Removal of Building Particulars

Dismantling refers to the physical removal of particulars such as contaminated pipes, sumps, drains, dry wall, floor tiles, ceiling tiles, etc. from buildings or other areas that do not affect structural integrity of the building or area. Dismantling can be the only remediation or can

be used in conjunction with decontamination or as a prelude to demolition. Dismantling can be applied to all buildings or only to select buildings.

Dismantling is potentially applicable to all types of contaminants and to building materials that can be disassembled. This action may create large volumes of waste (although not as much as demolition) which may need to be handled as a hazardous waste. Dismantling may or may not be the sole remediation action.

Recommendation - This option will be retained for further consideration because it meets the remedial action objectives.

3.4.5 Encapsulation

Encapsulation uses physical barriers to separate contaminants or contaminated structures from building occupants and the ambient environment. Physical barriers are constructed using plaster, epoxy resins, or concrete casts and walls. Acting as a shield, a barrier keeps the contaminants inside and away from clean areas, thereby alleviating the hazard.

Encapsulation is effective on all surfaces and building materials. The main advantage of encapsulation is the minimization of the volume of contaminated debris created, thereby reducing the amount of debris requiring disposal. The potential disadvantage of encapsulation is that the usage of the structure is sometimes limited or not possible because the structure is physically sealed off by the barrier.

Encapsulation can be implemented for any contaminants present at MTL. The equipment needed for encapsulation can easily be obtained from commercial vendors.

Recommendation - This process option will be retained for future consideration because it meets the remedial action objectives.

3.4.6 Steam Cleaning

Steam cleaning is a relatively inexpensive and simple technology that physically extracts contaminants from building and equipment surfaces. Steam is generated by a steam generator and is applied to building and equipment surfaces by a hand-held wand or an automated system. The condensate, which contains the removed contaminants, is collected and treated or disposed of off-site.

Steam cleaning is potentially effective for all contaminant types present at MTL although it is primarily a surficial decontamination technique. It may not be effective for contaminants that have absorbed into building materials. Steam cleaning is applicable to all types of surfaces and building materials. Potential disadvantages to steam cleaning are that large quantities of contaminated water may be generated and the process can be very labor intensive.

Recommendation - This process option will be retained for future consideration because it meets the remedial action objectives.

3.4.7 Grit Blasting

Grit blasting is a widely used surface removal technique in which an abrasive material (i.e., steel pellets, sand, alumina, dry ice, or glass beads) is used to remove surface contamination from a building or structure. This method can also be effective for removing contaminants that are within ⅛-inch of depth from the surface. Once all obstructions have been removed, the abrasive material is spray-applied to the material surface. The removed surface material and abrasive are collected and containerized for treatment or off-site disposal. The surface would then require cleaning of residual dust by vacuuming or water washing.

Grit blasting is potentially applicable to all contaminants present at MTL. This method can be used for any surface except glass or Plexiglass. This method is best used for large surface

areas. Because of the high velocities of the abrasive material used during grit blasting, there is the possibility that a building may be damaged structurally.

Recommendation - The process option will be retained for further consideration because it meets the remedial action objectives.

3.4.8 Strippable Coatings

Strippable coatings physically trap contaminants for easier handling and disposal. These coatings are applied to a contaminated surface, where they are bound with contaminants and subsequently removed to achieve decontamination. The strippable coatings process involves applying the polymer mixture to the contaminated surface and allowing it to react (polymerize) and coat the surface. As it polymerizes, the contaminant becomes attached to the polymer molecules. The polymer layer is peeled off, and the residue is removed with it. Cleanup requirements involve the removal of the strippable coatings from all surfaces.

Strippable coatings are applicable to all contaminants present at MTL and all surface materials. However, there is a possibility that the coating will not reach all the contamination on rough surfaces. Strippable coatings will not be effective on contaminants that have absorbed into building materials. The main disadvantage of using strippable coatings is that the coating may bind to the structure causing large volumes of waste and possible structural damage.

Recommendation - This process option will be retained for further consideration because it meets the remedial action objectives.

3.4.9 Fixative/Stabilizer Coatings

Fixative/stabilizer coatings can be applied to contaminated structures to fix or stabilize the contaminants in place and decrease or eliminate exposure without generating additional wastes. Stabilization agents that can be used include waxes, dyes, resins, or paints. The

stabilized contaminants can be left in place or removed later by a secondary treatment. Fixative or stabilizer coatings can be applied to a contaminated surface in four ways:

- In molten form as fine particles in an aqueous solution containing a wetting agent.
- By drying and simultaneously coating residues.
- By dissolving in a solvent, with the option of evaporating the solvent.
- By first soaking the contaminant with water and then applying a dye solution.

Fixative or stabilizer coatings are applicable to all contaminant types at MTL and for all surfaces and building materials.

Recommendation - This process option will be retained for further consideration because it meets the remedial action objectives.

3.4.10 Dusting/Vacuuming/Wiping

Dusting, vacuuming, and wiping involve the physical removal of dust and particles from building and equipment surfaces by common cleaning techniques. They can generate smaller volumes of waste and wastewater relative to other techniques. Wastes are contained in vacuum cleaner bags and are easily disposed of, as are wipe cloths. However, fugitive dusts created by the dusting or vacuuming actions may spread contamination.

This method is applicable to all types of contaminants found at MTL as well as all types of surfaces and building materials. It is a surface remediation technique and would not be effective on contaminants absorbed into building materials.

Recommendation - This process option will be retained for future consideration because it will meet remedial action objectives.

3.4.11 Hydroblasting/Water Washing

A high-pressure water jet is used to remove contaminated debris from surfaces and building materials. The debris and water are collected and treated or disposed of off-site. Hydroblasting can be varied to use hot or cold water, varied pressures, surfactants, or solvents.

This method is applicable to all types of contaminants found at MTL. It is primarily a surface remediation technique and may not be effective for contaminants that have been absorbed into building materials. This method is not applicable on wood or fiberboard materials.

Recommendation - This process option will be retained for further consideration because it meets the remedial action objectives.

3.4.12 Scarification

This remediation technique is capable of removing up to 2.5 cm of surface layer from concrete or cement surfaces. The scarifier will strike the surface causing it to chip. Scarification can achieve a deeper penetration than most other surface removal techniques. It can be applied to both large open areas and small areas. The technique can produce large quantities of waste and can generate contaminant-laden dust. The treated surface will be rough and may require resurfacing.

This method is applicable to all contaminants present at MTL. Scarification is only applicable to concrete or cement surfaces (not concrete block). It is not applicable for hard-to-reach areas unless obstructions (such as vents or pipes) can be removed.

Recommendation - This process option will be retained for further consideration because it meets the remedial action objectives for applicable surfaces.

3.4.13 Flaming

This remediation technique is a controlled high-temperature flame that is applied to noncombustible surfaces to thermally degrade contaminants. This method is primarily a surface decontamination technique. Damage to the surface or building materials could result. Toxic vapors may result from the thermal degradation by flaming. Proper safety equipment would be required to prevent personnel exposure to heat or toxic gases.

This method is not effective for metal contamination and would not be appropriate for any combustible building material or surface or for surfaces contaminated with explosive compounds.

Recommendation - This process option will not be considered further because of its nonapplicability to metals and its high safety concerns.

3.4.14 Drilling and Spalling

This technique can remove up to 5 cm of surface from concrete or cement. Holes are drilled into the surface. The spalling tool bit is inserted into the hole and hydraulically spreads to spall off the contaminated surface. This technique can achieve deeper surface penetration than other surface remediation techniques. It is primarily used for large-scale applications.

This method is applicable to all contaminants present at MTL. It is applicable only to concrete and cement surfaces. It is not applicable for hard-to-reach areas unless obstructions (such as vents or pipes) can be removed. This method also creates large amounts of waste and can generate large amounts of dust.

Recommendation - This process option will be considered further because remedial action objectives will be obtained for the applicable surfaces.

3.4.15 Solvent Washing

Solvent washing involves applying an organic solvent to the surface material to solubilize contaminants. Spent solvent is collected and treated and recycled or disposed of off-site. Multiple solvent washes or some type of secondary treatment may be needed for total removal of contaminants. A water wash may be necessary to remove the solvent contained in porous materials.

Solvent washing is applicable to all surfaces and building materials. The primary difficulty is to achieve an inward flux of clean solvent into porous materials followed by an outward flux of solvent contaminated with residues. Solvent washing may also not be effective in removing metals.

Recommendation - This process option will be retained for further consideration because this method in combination with other techniques will achieve remedial action objectives.

3.4.16 Vapor Phase Solvent Extraction

Vapor phase solvent extraction involves heating a volatile organic solvent to vaporization and allowing the vapors to circulate throughout the contaminated building. The vapors permeate into porous building materials, where they condense, solubilize contaminants, and diffuse outward. The contaminant-laden solvent is collected in a sump and treated and recycled or disposed of off-site.

As with solvent washing, this method may not be effective against metals. The primary difficulty is to achieve an inward flux of clean solvent into porous materials followed by an outward flux of solvent contaminated with residues. This method has never been demonstrated to be effective inside buildings.

Recommendation - This process option will not be retained for further consideration because its potential effectiveness has never been demonstrated and would be questionable.

3.4.17 <u>Fluorocarbon Extraction</u>

Fluorocarbon extraction of contaminants involves the pressure-spraying of a fluorocarbon solvent onto the surface. The solvent is collected and treated and recycled or disposed of off-site. This is similar to the solvent washing technique.

This method has the same problems associated with solvent washing. In addition, fluorocarbon solvent should not be used in the presence of chemically active metals such as beryllium (which is prevalent in Building 312).

<u>Recommendation</u> - This process option will not be retained for further consideration because of its questionable effectiveness and incompatibility with beryllium.

3.4.18 <u>Alkali or Acid Etching</u>

Alkali or acid is applied to a contaminated surface to promote corrosion and removal of the surface layer. The debris is then neutralized and disposed of off-site. Residual alkali or acid on the treated surface may require neutralization. Alkali or acid can be applied by hand or by pressure sprayer. Proper personal protective equipment would be required.

This method is applicable to contaminants present at MTL. It is primarily applicable to metal and wood surfaces. The method is only a surface treatment technique. It is not effective on contamination absorbed into building materials.

<u>Recommendation</u> - This process option will be retained for further consideration because remedial action objectives may be achieved for applicable surfaces.

3.4.19 <u>Bleaching</u>

Bleach formulations are applied to surfaces, allowed to react with contaminants, and removed. Bleaching usually occurs in conjunction with other remediation methods. In the

process, bleach is applied to a surface and the surface is scrubbed. After the surface is allowed to stand, the surface is flushed with water. The process can therefore generate large quantities of wastewater.

This method is primarily applicable to pesticides. It is not effective for metal contamination. It can be used on any surface but is most effective on metal surfaces. The bleach may cause corrosion of the surface.

Recommendation - This process option will be retained for further consideration because remedial action objectives may be obtained with this option.

3.4.20 Photochemical Degradation

In this process, ultraviolet light is applied to a contaminated surface for some period of time. Photodegradation of the contaminant results.

Photochemical degradation as applied at MTL has several problems. First, it would not be effective for metal contamination. It would not work on contaminants absorbed in building materials because it is only applicable to surface contamination. It would be difficult to apply in areas with obstructions. The overall effectiveness of photochemical degradation of the various organic contaminants would be questionable. Implementing this technology would require installing many UV lamps at a high capital and energy cost.

Recommendation - This process option will not be retained for further consideration because it could not be effectively implemented.

3.4.21 Microbial Degradation

Contaminants are biologically decomposed by microbes capable of using the contaminant as a nutrient source. Microbes are applied to the surface in an aqueous medium and

allowed to digest the contaminant over time. The microbes are then destroyed and washed away.

This technique has never been demonstrated to be effective inside buildings. In addition, this method would not be applicable to metal contamination. For many indoor areas at MTL, it would not be feasible to establish the aqueous medium required for this method.

Recommendation - This process option will not be retained for further consideration because it would not be effectively implemented at MTL.

3.5 SUMMARY OF TECHNOLOGIES

Table 3-5 provides a summary of the initial screening and evaluation of process options for the indoor areas at MTL and indicates the options that have been screened out.

Table 3-5

U.S. Army Materials Technology Laboratory
Response Actions/Remedial Technologies/
Initial Screening and Evaluation of Process Options for Indoor Areas

Response Action	Remedial Technology	Process Options	Description	Screening Comments
No Action	None	None	No remedial actions taken.	Potentially applicable.
Institutional Actions	Access Restrictions	Post site areas and install fences	Install fences and warning signs around buildings and property.	Potentially applicable.
		Restrict land use	Deeds of property in the area of influence to restrict usage.	Potentially applicable.
	Monitoring	Air monitoring	Ongoing monitoring of air quality inside buildings.	Potentially applicable.
Demolition	Demolition	Demolition of on-site buildings	Total destruction of building or structure. Debris is disposed of off-site.	Potentially applicable.
	Dismantling/Removal of Particulars	Dismantling/removal of building particulars	Dismantling and removal of particulars such as pipes or flooring materials that does not affect the building structural integrity. Particulars are disposed of off-site.	Potentially applicable.

Table 3-5

**U.S. Army Materials Technology Laboratory
Response Actions/Remedial Technologies/
Initial Screening and Evaluation of Process Options for Indoor Areas
(Continued)**

Response Action	Remedial Technology	Process Options	Description	Screening Comments
Treatment	Physical Treatment	Encapsulation	Contamination physically separated from building occupants and the ambient environment by a barrier such as plaster or concrete.	Potentially applicable for chemical contamination.
		Steam cleaning	Steam physically extracts contaminants from surfaces and building materials. Condensate is collected for treatment.	Potentially applicable for chemical contamination.
		Grit blasting	Abrasive material such as steel pellets, sand, alumina, or glass beads used for uniform removal of contaminated surface layers.	Potentially applicable for chemical contamination. Not effective on glass or Plexiglass.
		Strippable coatings	Compounds that bind with contaminants are mixed with a polymer, applied to a contaminated surface, and subsequently removed.	Potentially applicable for chemical contamination.

Table 3-5

U.S. Army Materials Technology Laboratory
Response Actions/Remedial Technologies/
Initial Screening and Evaluation of Process Options for Indoor Areas
(Continued)

Response Action	Remedial Technology	Process Options	Description	Screening Comments
Treatment (continued)	Physical Treatment (continued)	Fixative/stabilizer coatings	Agents such as waxes, dyes, resins, or paints can be used to coat the contaminated area. The stabilized contaminants can be left in place or removed later.	Potentially applicable for chemical contamination.
		Dusting/vacuuming/wiping	This involves the physical removal of dust and particulates from surfaces by common cleaning techniques.	Potentially applicable for chemical contamination.
		Hydroblasting/water washing	A high-pressure water jet is used to remove contaminated debris from surfaces. The debris and water are collected and decontaminated or disposed of.	Potentially applicable for chemical contamination. Not applicable on wood or fiberboard.
		Scarification	Can remove up to 2.5 cm of surface layer from concrete or similar materials by chipping.	Potentially applicable but only for concrete or cement surfaces.

Table 3-5

U.S. Army Materials Technology Laboratory
Response Actions/Remedial Technologies/
Initial Screening and Evaluation of Process Options for Indoor Areas
(Continued)

Response Action	Remedial Technology	Process Options	Description	Screening Comments
Treatment (continued)	Physical Treatment (continued)	Flaming	Controlled high temperature flames are applied to noncombustible surfaces to thermally degrade contaminants.	Not applicable. Not effective for metal contamination. Effectiveness uncertain for other chemical contamination. High safety concerns.
		Drilling and spalling	Can remove up to 5 cm of surface from concrete or similar materials. Holes are drilled into surface and spalling tool inserted and hydraulically spread to spall surface.	Potentially applicable but only for concrete or cement surfaces.
	Chemical Treatment	Solvent washing	Organic solvent spread across surface to solubilize contaminants. Solvent is collected and treated, recycled, or disposed of.	Potentially applicable for chemical contamination. May not be effective for metals.

Table 3-5

U.S. Army Materials Technology Laboratory
Response Actions/Remedial Technologies/
Initial Screening and Evaluation of Process Options for Indoor Areas
(Continued)

Response Action	Remedial Technology	Process Options	Description	Screening Comments
Treatment (continued)	Chemical Treatment (continued)	Vapor phase solvent extraction	Organic solvent with a low boiling point is vaporized and circulated in a building. Solvent permeates into surfaces, condenses, solubilizes contaminants, and diffuses outward. Solvent is collected and treated.	Not applicable. Could not be effectively implemented in building interiors.
		Fluorocarbon extraction	Pressure-spraying of fluorocarbon solvent onto surfaces. Solvent is collected and treated or disposed of.	Not applicable. Not effective for metals. Incompatible with reactive metals such as beryllium.
		Alkali or acid etching	Alkali or acid is applied to a surface to promote corrosion and removal of surface layer. Debris is neutralized and disposed of.	Potentially applicable primarily on metal or wood surfaces. May not be effective on other surfaces.
		Bleaching	Bleach formulations are applied to a surface, allowed to react with contaminants, and removed.	Potentially applicable for pesticide and organic chemical contamination only.

Table 3-5

U.S. Army Materials Technology Laboratory
Response Actions/Remedial Technologies/
Initial Screening and Evaluation of Process Options for Indoor Areas
(Continued)

Response Action	Remedial Technology	Process Options	Description	Screening Comments
Treatment (continued)	Chemical Treatment (continued)	Photochemical degradation	Ultraviolet light is applied to a surface resulting in photodegradation of the contaminants.	Not applicable. Not effective for metal contamination. Effectiveness on organics in building interiors is questionable.
	Biological Treatment	Microbial degradation	Microbes are applied to area in an aqueous medium and allowed to digest contaminants. Microbes are then destroyed or washed away.	Not applicable. Not effective for metal contamination. Has never been demonstrated to be effective in building interiors.

SECTION 4

DEVELOPMENT AND SCREENING OF REMEDIAL ACTION ALTERNATIVES

In Section 3, various remedial technology process options were screened for their applicability to the indoor areas at MTL. In this section, the technology process options retained for further consideration were combined into remedial alternatives. These remedial alternatives were then screened on the basis of their effectiveness, implementability, and cost. The alternatives that survive this screening are subjected to detailed analysis (Section 5).

Subsection 4.1 presents the rationale for developing remedial alternatives. These alternatives were assembled from the process options identified and screened in Section 3 to meet the remedial action objectives. These potential alternatives are screened in Subsection 4.2 on the basis of their effectiveness, implementability, and cost in relation to the site, waste, and technology characteristics. The effectiveness evaluation focused on the reliability of the technology including its stage of development, performance, and reliability in meeting the action levels for this site. The implementability discussion primarily involved institutional and technical concerns. Finally, costs of implementing a particular option were considered on a relative basis. Capital and operation and maintenance (O&M) costs were generally qualified as low, moderate, or high relative to process options of the same technology type. Based upon these considerations, a recommendation was made to retain or eliminate the alternative from further consideration.

4.1 <u>DEVELOPMENT OF ALTERNATIVES</u>

Remedial alternatives were developed to represent various levels of protection for human health and the environment. The alternatives consist of:

- Alternatives that eliminate, to the extent feasible, the need for long-term management at the site.

- Alternatives that use treatment as a primary component to reduce the toxicity, mobility, or volume (TMV) of contaminated materials.

- Alternatives that involve containment to prevent potential exposure and/or to reduce the mobility of contaminants.

- Alternatives that involve only institutional actions to prevent potential exposure to contaminants.

- A no-action alternative.

Specific response actions incorporated into the development of alternatives to meet remedial objectives for contaminated soil are as follows:

- No action.
- Institutional actions.
- Demolition.
- Treatment.

4.1.1 No Action

The no-action alternative has been evaluated as a baseline against which other alternatives may be compared. Under this alternative, contaminants would remain in the building surfaces. Only natural processes would degrade organic contaminants.

4.1.2 Institutional Actions

One alternative was developed to address institutional actions performed at the site. Such actions would not remediate the contaminants but would reduce risk by limiting exposure to the contaminants. Such actions include placing signs and fencing around contaminated buildings, upgrading site security to prevent unauthorized access to fenced areas, and placing deed restrictions on property transactions to prevent use of contaminated buildings.

4.1.3 Demolition

One alternative was developed to remove contaminants on-site by razing buildings that contain contaminated surfaces. The building debris including contaminated materials would be removed from the site and disposed of in compliance with regulations.

4.1.4 Treatment

Two alternatives were developed that involved the removal of contaminants by treatment of the building surfaces. The types of treatment include many options that are screened separately in Subsection 4.2. The types of options include methods that would either remove contaminants from the surfaces or contain them on the surfaces such that no exposure would occur. Also included is the option to remove contaminated items that cannot be contained or directly decontaminated such as drains, floor and ceiling tiles, and dry wall material.

4.1.5 MTL Indoor Remedial Action Alternatives

Five alternatives that include remedial technologies that provide various levels of protection have been developed for the MTL buildings. These alternatives have been given the designation "B" prior to their numbers.

The building alternatives are summarized in Table 4-1 and as follows:

- Alternative B1 is no action.
- Alternative B2 is institutional actions which includes access and deed restrictions.
- Alternative B3 is the demolition alternative in which the contaminated buildings are demolished and the debris is removed for off-site disposal.
- Alternative B4 involves the decontamination of building surfaces. This alternative contains twelve options for decontamination:

- Option A - Encapsulation
- Option B - Steam Cleaning
- Option C - Grit Blasting
- Option D - Strippable Coatings
- Option E - Fixative/Stabilizer Coatings
- Option F - Dusting/Vacuuming/Wiping
- Option G - Hydroblasting/Water Washing
- Option H - Scarification
- Option I - Drilling and Spalling
- Option J - Solvent Washing
- Option K - Alkali or Acid Etching
- Option L - Bleaching

- Alternative B5 involves the use of the decontamination methods in Alternative B4 but also includes dismantling and removal or surfaces and items that cannot be effectively decontaminated. Such items include dry wall, floor and ceiling tiles, drains, and sumps.

4.2 SCREENING OF ALTERNATIVES

4.2.1 Alternative B1 — No Action

Under the no action alternative, no remedial actions would be implemented for the indoor areas at MTL. Contamination would remain uncontrolled, allowing for possible human contact. Contamination could also be spread to other areas at MTL or off-site. This alternative would not allow the Army to sell the property, which is one of their goals.

Effectiveness — Since no action would not involve a remedial action, remedial action objectives would be reached only by long-term natural attenuation processes. This will occur only after an extended period of time during which contamination may be spread to other areas. Long-term attenuation may never achieve remedial action objectives. The no action approach would not affect the potential historic significance of the buildings.

Implementability — The no action alternative is easily implemented.

Cost — The no action alternative has no associated remediation costs.

Table 4-1

Alternatives for Remediation of Indoor Areas
U.S. Army Materials Technology Laboratory

Alternative B1 - No Action

- No remedial actions implemented.

Alternative B2 - Institutional Actions

- Monitoring of air quality in indoor areas.
- Construction of fences around contaminated buildings and placement of signs to restrict access.
- Modification of deeds to restrict site development.

Alternative B3 - Demolition of Indoor Areas

- Chemical contamination remediated by demolition of on-site buildings.
- Debris is removed for off-site disposal.

Alternative B4 - Decontamination of Indoor Areas

- Chemical contamination removed at all necessary indoor areas by physical or chemical treatment.
- Specific treatment technology matrix established to determine which technologies will be used in each particular indoor area. Options include:

  - Option A - Encapsulation
  - Option B - Steam Cleaning
  - Option C - Grit Blasting
  - Option D - Strippable Coatings
  - Option E - Fixative/Stabilizer Coatings
  - Option F - Dusting/Vacuuming/Wiping
  - Option G - Hydroblasting/Water Washing
  - Option H - Scarification
  - Option I - Drilling and Spalling
  - Option J - Solvent Washing
  - Option K - Alkali or Acid Etching
  - Option L - Bleaching

- Off-site disposal of waste generated by treatment

Alternative B5 - Decontamination/Dismantling of Indoor Areas

- Chemical contamination removed by physical or chemical treatment as established by treatment technology matrix of Alternative B4.
- Dismantling of building particulars that cannot be more easily decontaminated by treatment.

Recommendation — This alternative is retained for detailed analysis and will serve as a baseline comparison against other alternatives. This alternative does not meet the MCP definition of a permanent or temporary solution.

4.2.2 Alternative B2 — Institutional Actions

Under the institutional action alternative, no remedial actions would be taken to remove contamination; however, measures would be taken to reduce potential risks to human health and the environment. These actions include restricting access to contaminated areas by locking buildings, installing fences, and posting signs. In addition, deed restrictions could be placed to prevent site development of contaminated areas. Continued monitoring of air quality in the contaminated areas would take place if the areas were not totally restricted to entry. Periodic site security checks would be made.

Effectiveness — Institutional actions would achieve the remedial action objectives even though they do not reduce the contamination in the buildings and other areas. Therefore, health risks associated with exposure in the buildings still exist for anyone who bypasses the locks and enters any of the buildings in the future. In addition, the chance of spreading contamination will remain.

Implementability — Deed restrictions will require cooperation with local authorities. The remaining actions are easily implemented.

Cost — Costs for implementing this alternative are expected to be relatively low as compared to alternatives that remove contaminants.

Recommendation — This alternative is retained for detailed analysis. It would be a permanent solution under the MCP although long-term maintenance of the controls would be required.

4.2.3 Alternative B3 — Demolition of Indoor Areas

There are 17 contaminated buildings at MTL. In this alternative, some or all of these buildings will be reduced to debris by using wrecking balls and backhoe-mounted rams. The debris will contain all the contaminants present at MTL including PCBs, metals, and pesticides. The debris will be removed to an off-site landfill for disposal. The debris will have to be tested to determine if it would be classified as a hazardous waste. If the RCRA land disposal restrictions prevent landfill disposal, the debris will require treatment.

The demolition alternative will proceed according to the following steps:

- Pretreatment of contaminant residues (i.e., wetdown of building surfaces and collection of water).
- Demolition.
- Debris collection.
- Waste treatment and/or disposal.

Effectiveness — Demolition is an effective and reliable technology because complete removal of contaminated structural materials from the site is achieved. A disadvantage to this method is the large quantity of waste debris requiring disposal. This method of remediation could be considered to be excessive at MTL as none of the buildings contain high concentrations of contaminants. Thus demolition of an entire structure may not be warranted.

Implementability — This alternative is not difficult to physically implement. Before demolition is initiated, structural surfaces must be moistened to minimize airborne contamination during demolition.

The demolition alternative affects the historical significance of the site buildings. According to the Memorandum of Agreement between MTL, the Advisory Council on Historic Preservation, and the Massachusetts Historic Preservation Officer, 11 contaminated buildings

are listed as contributing historical significance. The agreement may prevent the demolition of these buildings. At a minimum, only partial demolition would be allowable; a historically significant portion of each building must remain. It is likely that surface decontamination of the remaining portion would be required.

Costs — Costs for utilities, labor, and fuel for operating the demolition and cleanup equipment should be moderate. Costs associated with disposing of the debris could be high. The overall cost for this alternative is usually higher than the cost for most types of decontamination. Demolition of Building 39 is being considered because it may not fit into plans for future use of the property.

Recommendation — Although this alternative would be a permanent solution under the MCP, it will not be retained for detailed evaluation. Contamination levels in the buildings do not necessarily warrant demolition of the buildings. Also, the Memorandum of Agreement may prevent the demolition of buildings with historical significance. Demolition would only be considered if a building cannot achieve remedial goals via decontamination, or, as in the case of Building 39, it does not fit into plans for future use of the property.

4.2.4 Alternative B4 — Decontamination of Indoor Areas

This alternative involves the physical and chemical treatment options to remove contamination from the indoor areas by decontaminating the various surfaces and building materials. Contaminants are removed to obtain the chemical-specific cleanup objectives for buildings. The removed contaminants and associated decontamination process waste (wastewater, dust, solvents, etc.) are contained and disposed of off-site. Because of the variations of contaminants and surface or building materials in the indoor areas requiring decontamination, this alternative will use multiple decontamination process options. Of the treatment options described in Section 3, 12 different process options survived the technology screening. These include:

- Encapsulation
- Steam Cleaning

- Grit Blasting
- Strippable Coatings
- Fixative/Stabilizer Coatings
- Dusting/Vacuuming/Wiping
- Hydroblasting/Water Washing
- Scarification
- Drilling and Spalling
- Solvent Washing
- Alkali or Acid Etching
- Bleaching

All of these process options will be evaluated separately in this subsection to determine their applicability for inclusion in a detailed alternative analysis for decontamination.

4.2.4.1 Option A — Encapsulation

Effectiveness — Encapsulation establishes an impenetrable barrier that isolates contaminated surfaces or structures. Encapsulation reduces the amount of contaminated debris requiring disposal. At MTL, encapsulation would be best used only for those areas where contamination cannot be easily removed from the particular surface or where contamination has absorbed into the surface. Encapsulation may restrict future use of an area because of the potential migration of contaminants to the surface or the uncovering of contaminants during future renovation work.

Implementability — Encapsulation can be readily implemented at MTL at indoor areas except those where confined entry is required. The equipment needed for encapsulation can easily be obtained from commercial vendors. Necessary equipment includes shearing equipment to remove loose solids, barrier materials, application equipment, and personal protective gear. Moderate time is needed for the removal of loose solids, application of encapsulating materials and a period for the encapsulating material to take final form. Depending on the type of encapsulation, the historical significance of the buildings could be affected.

Cost — Overall costs should be moderate when compared to other decontamination options; costs for utilities and fuel should be low. Equipment and material costs will make up most of the treatment costs. Labor and disposal costs should be low.

Recommendation — This option will not be retained for detailed analysis because encapsulation is not a permanent solution. Contaminants are not treated or removed and long-term monitoring of the encapsulating material would be required. Eventually, as the encapsulation breaks down, other remediation techniques may be necessary.

4.2.4.2 Option B — Steam Cleaning

Effectiveness — Steam cleaning is a labor-intensive process that is very effective for surface decontamination. It is mainly used to remove contaminated particulates. In addition, steam cleaning may be effective in removing contaminants from the subsurface if continually applied over a long period of time. However, this has not been demonstrated. Steam cleaning may not be effective in removing contaminants in a non-water-soluble liquid (e.g., PCB-containing oil residue).

Implementability — Steam cleaning can be readily implemented. Commercial-scale steam cleaners are available from many vendors. Equipment and support facilities needed for steam decontamination include a steam generator, spray systems, collection sumps, and water containment. Depending on the size and complexity of the structure, personnel time could be extensive.

Steam cleaning generates large quantities of contaminated water that may require disposal as a hazardous waste. Alternatively, the contaminant concentration of the water could be insignificant and could be discharged to a Publicly-Owned Treatment Works (POTW). Testing of the wastewater would be required.

Cost — Cost for utilities should be low because steam is relatively inexpensive to generate. Equipment and support facilities costs should be moderate. Labor costs should be moderate

because several applications may be necessary. Waste disposal costs could be low or high depending on the quality of the wastewater.

Recommendation — This option could be used effectively to achieve a permanent solution and will be retained for detailed analysis.

4.2.4.3 Option C — Grit Blasting

Effectiveness — Surface layer contaminants are completely removed; however, this method is ineffective for depths greater than about 0.5 to 1.5 cm. This option can be effective in hard-to-reach areas such as ceilings and behind pipes.

Implementability — Grit blasting is applicable to all surfaces but glass or Plexiglass. The process can generate large amounts of dust and can make contaminants airborne as particulates which can result in the spread of contaminants to other surfaces as well as increasing the potential for personnel contamination. Because of the high velocities of the abrasive material used, structural damage is possible, which may affect the historical significance of the buildings. For specific types of abrasives, sand is best used on walls but it generates large quantities of waste which may require disposal as hazardous waste. Shot blasting can be done only on floors but it generates less waste than sand blasting and attached systems can better contain dust. Grit blasting using dry ice (CO_2) may be preferred since the blasting material does not create additional waste as with sand or shot.

Operating labor is needed for grit blasting, collection of debris, and cleanup. The debris would require testing before off-site disposal. Equipment required for grit blasting include a blast gun, pressure lines, air compressor, abrasive material, debris/dust collection system, and dust cleanup equipment. Remote control units are available. Approximately 35 m^2 can be grit blasted in an 8-hour day.

Grit blasting would also not be used on materials that would be damaged such as floor tiles, dry wall, or wood paneling or on materials that were contaminated with explosive residues.

Cost — Equipment costs are expected to be moderate to high as is the cost of the abrasives. This method is labor-intensive so labor costs would be high. Disposal cost of the debris may also be high. Disposal costs using dry ice would be lower because no waste blasting material is generated. When compared to other decontamination options, grit blasting is often one of the more costly options.

Recommendation — The option could be used effectively to achieve a permanent solution and is retained for detailed analysis.

4.2.4.4 Option D — Strippable Coatings

Effectiveness — Ideally, a strippable coating should remove all the contaminants it contacts, especially on smooth surfaces. However, there is a possibility that the coating will not reach all the contamination on rough surfaces, especially if it has a high surface tension or if the polymer molecules are too large to fit into the pore space. Paint removal may be needed prior to application of the coating.

Depending on the number of contaminants in the particular area, several different coatings may need to be used. Secondary treatment may be needed depending on how effective the polymer is in removing the contaminant and on how deeply the contaminant has penetrated the material. This method can be very cumbersome and provides no additional advantages over surface decontamination techniques.

Implementability — Equipment and support facilities are minimal. A mixing tank for the coating is the major process component. The process can produce large quantities of waste that must be disposed of. No structural damage to the buildings should result from this option. The process can be labor intensive depending upon how effective it is and how much pretreatment or secondary treatment is required.

Cost — Equipment and utility costs should be low. Labor costs could be moderate to high depending on the effectiveness. Disposal costs will depend upon the quantity of waste generated.

Recommendation — The process option will not be retained for detailed analysis. This option may not be as effective as other simple surface decontamination techniques. This option is cumbersome and provides no advantages over other surface decontamination options.

4.2.4.5 Option E — Fixative/Stabilizer Coatings

Effectiveness — Contaminants are not removed from the surface. They remain in place in stabilized or immobilized condition. Their effectiveness, as measured by reductions in ambient air levels, ranges from about 10 to 30%, depending on the fixative or stabilizer used. Monitoring of the effectiveness of the coating is required over its lifetime. Removal of the coatings may be required at a late date.

Implementability — Testing may be necessary to determine which coating(s) would be effective for which contaminants. Some contaminants, such as PCBs, may migrate through coatings such as paints. The application of the coating is easily implementable. No structural damage to the buildings should occur from this option. This option is best used in combination with other surface decontamination options.

Cost — Overall costs should be low when compared to other decontamination options. They include utilities, equipment, coating material, and labor. Costs would be high if the amount of the coating required is large or if the coating material cost is high. Disposal costs will be small as only minimal waste is generated.

Recommendation — This option will not be retained for detailed analysis because it is not a permanent solution. Contaminants are not treated or removed and long-term monitoring

of the coating would be required. Eventually, as the coating breaks down, other remediation techniques may be necessary.

4.2.4.6 Option F — Dusting/Vacuuming/Wiping

Effectiveness — Residue levels should be low after thorough vacuuming and dusting. This process will not remove contaminants absorbed into surface materials. If residue levels are unacceptable after vacuuming and dusting, wiping with a water or solvent soaked cloth may be necessary. This option can be the only required decontamination technique. It can also be a secondary treatment for other options such as grit blasting, or could be a pretreatment for other options such as fixative/stabilizer coatings.

Implementability — Dusting and vacuuming are applicable to all types of particulates and on all types of surfaces. It is easily implemented at MTL except in confined space entries. The dust and debris would be collected for off-site disposal.

Cost — The costs for this option are low when compared to other decontamination options. Disposal costs should also be low.

Recommendation — This option could be used effectively to achieve a permanent solution and will be retained for detailed analysis.

4.2.4.7 Option G — Hydroblasting/Water Washing

Effectiveness — This option is anticipated to provide complete removal of surface contamination. Hydroblasting may not be effective on removing contaminants beneath the surface layer. High pressures and chemical additives can increase the effectiveness of removing subsurface contamination. This option is not applicable to wood or fiberboard surfaces.

Implementability — This option is best suited for large open areas as opposed to small cluttered rooms. Required equipment for this option include a water blasting system consisting of high-pressure pump hoses and nozzles, water collection sumps or vacuums, water storage containers, and water pumps. This option may cause structural damage at high velocities and may damage insulation or wooden surfaces.

At MTL, hydroblasting would not be used in small rooms or on surfaces that could be damaged such as dry wall or wood paneling. Also it would not be used on surfaces that contain explosive residues.

This option will create large quantities of wastewater which may be difficult to collect. The water will have to be analyzed for contaminant concentrations. The water may require disposal as a hazardous waste or may be discharged untreated to the POTW, depending on its quality.

Cost — Equipment costs should be moderate to high with utility costs being moderate. Labor costs can be high as the process can be very labor intensive. Disposal costs could be low to high depending on wastewater volume and quality. Overall costs are high in comparison to other decontamination options.

Recommendation — This option could be used effectively to achieve a permanent solution and will be retained for detailed analysis.

4.2.4.8 Option H — Scarification

Effectiveness — This option is effective only on a poured concrete, cement, or steel surfaces. It can remove contaminants up to a depth of 2.5 cm from the surface. Additional treatment would be required if contamination is deeper than 2.5 cm. It is applicable to both large open areas and small areas.

Implementability — This option is best suited for poured concrete floors that have subsurface contamination. It can also be used on steel surfaces. The required equipment is a portable scabbler which is a smaller version of a scarifier designed for indoor use. Dust and debris containment and collection systems are also required. Large amounts of waste will be generated. The process will produce a rough finished surface that must be refinished. Operating labor will be needed for scarifying, collecting of debris, and cleanup. The process can produce a large amount of dust, although work can be done inside a tent or a vacuum dust collection system can be attached to limit the spread of contamination.

At MTL, scarification would be limited to concrete or block surfaces where subsurface contamination is present.

Cost — Equipment costs for a scarifier, replacement bits, and an air compressor would be moderate to high. Labor costs would be high because the removal rate is slow. Large quantities of waste may be generated and disposal costs may also be substantial. Overall costs are high in comparison to other decontamination options.

Recommendation — This option could be used effectively to achieve a permanent solution and will be retained for detailed analysis.

4.2.4.9 Option I — Drilling And Spalling

Effectiveness — The option is effective only on a poured concrete or cement surface. It can remove contaminants up to a depth of 5 cm from the surface. Its applicability depends on interior building configuration.

Implementability — This option is suitable for removal of deep sections of concrete floor.

Cost — Equipment costs would be moderate to high. Labor costs would be high as the process is time-consuming. Large quantities of waste will be generated which may result in high disposal costs. Overall costs are high in comparison to other decontamination options.

Recommendation — This option will be retained for detailed analysis because deep subsurface decontamination may be present.

4.2.4.10 Option J — Solvent Washing

Effectiveness — If the proper solvent is selected, it should extract most of the contaminants it contacts on surfaces. It may not be effective on metal contamination. This option will probably require more than one application. It can be effective on porous surfaces but it may be difficult to remove the solvent from the subsurface.

Implementability — Solvent washing has successfully removed hazardous waste from contaminated buildings. However, testing would be required prior to any remedial work to obtain an effective solvent-contaminant match.

Problems that might be encountered with solvent washing include:

- Residual solvent in building materials may require removal or decomposition.
- Solvent outward diffusion may require long periods of time.
- Solvent may transport contaminants further into the material before outward movement begins.

Solvent washing should not affect the historic significance of the buildings.

Cost — Equipment costs will be moderate depending on the complexity of the solvent recovery system. Labor costs may be high. Costs for utilities should be low. Material costs depend on the reuse of solvent.

Recommendation — This option could be used effectively to achieve a permanent solution and will be retained for detailed analysis.

4.2.4.11 Option K — Alkali or Acid Etching

Effectiveness — This option is most effective on metal and wood surfaces. It may be ineffective on other surfaces. Secondary treatment may be required for porous surfaces or for contaminants that are below the surface level because this option is only a surface treatment.

Implementability — Reagents are spray-applied to the surface to induce corrosion. It may be necessary to remove paint from the surface prior to acid or alkali application. This method may cause structural damage because the applied areas are subject to corrosion.

Required equipment include spraying equipment, water sprayer, acid or alkali source and neutralizer, and possibly a steam source. Safety equipment will be required to prevent exposure to the reagents. Also this option can generate large quantities of waste requiring disposal.

At MTL, the application of this option would be limited to metal and wood surfaces.

Cost — Equipment costs would be low. Labor costs for application and cleanup would be low to high. Disposal costs could be low to high. When compared to other decontamination options, overall costs should be low.

Recommendation — This option could be used effectively to achieve a permanent solution and will be retained for detailed analysis.

4.2.4.12 Option L — Bleaching

Effectiveness — This option is most effective against liquid pesticide spills. It has been used on metal, wood, and concrete, but is most effective on metal surfaces. Bleach is normally used in conjunction with other decontamination methods, most often as a followup for physical surface decontamination.

Implementability — Equipment required for this option include bleach application and water washing equipment, waste recovery system, and safety equipment. Hazardous sludges and liquids may be produced by this option.

While this option can be implemented at MTL, the pesticide concentrations are not great enough to warrant this type of decontamination. This option would create more wastes than it would remove.

Cost — Equipment costs should be moderate. Labor costs should be low. Disposal costs could be low to moderate. Overall costs should be low in comparison to other decontamination options.

Recommendation — This option will not be retained for detailed analysis because the contamination at MTL does not warrant this type of decontamination.

4.2.5 Alternative B5 — Decontamination of On-Site Areas with Dismantling of Particulars

This alternative combines the decontamination methods in Alternative B4 with dismantling of building particulars. Dismantling refers to the physical removal of selected structures (such as vents, pipes, floor tiles, internal dry walls, etc.) from indoor areas. Dismantling is performed for heavily contaminated items that can be completely removed when it is either easier or more economical to remove the particulars rather than decontaminate them.

Effectiveness — By itself, dismantling would probably not meet all remedial action objectives. When combined with decontamination techniques, the action objectives should be obtained. When a particular area or structure could be decontaminated by dismantling or by physical or chemical cleaning, the area in question would be decontaminated by the method that is easier to implement and is less costly.

Implementability — This alternative can be readily implemented at MTL. Structures to be dismantled would only be dismantled if they cannot be easily and effectively cleaned and decontaminated. Specific implementability of decontamination was discussed in Subsection 4.2.4.

Dismantled particulars will still be contaminated and may require disposal as hazardous waste. Alternatively, they may be decontaminated after removal from the building. Dismantling should not cause structural damage but may affect the historical significance of the buildings.

Cost — Costs for decontamination were discussed previously in Subsection 4.2.4. Costs for dismantling could be low to high and would depend upon the extent of dismantling procedures. Costs for dismantling should be low when compared to demolition or decontamination.

Recommendation — This alternative would be a permanent solution and will be retained for detailed analysis.

4.3 SUMMARY OF REMEDIAL ALTERNATIVE SCREENING PROCESS

A summary of the remedial alternatives screening process is presented in Table 4-2. For each remedial alternative or process option, a decision of acceptance or rejection is given along with the rationale for that decision. A list of the remedial alternatives retained is shown in Table 4-3. Those remedial alternatives that survived the screening process will be evaluated in the detailed analysis of remedial alternatives in Section 5.

Table 4-2

Screening of Remedial Alternatives for Indoor Areas
U.S. Army Materials Technology Laboratory

Remedial Alternative	Effectiveness	Implementability	Cost	Recommendation
Alternative B1 - No Action	Remedial objectives only reached through long-term attenuation. Contamination may be spread to other area.	Alternative is easily implemented.	No costs associated with no action.	Retained for detailed analysis. Used as a baseline of comparison for other alternatives.
Alternative B2 - Institutional Actions	Remedial objectives achieved although contamination remains in place. Contamination may be spread to other areas.	Deed restrictions require cooperation with local authorities. Other actions are easily implemented.	Low capital and low O&M.	Retained for detailed analysis.
Alternative B3 - Demolition of Indoor Areas	Demolition is effective as complete contaminant removal is achieved. Alternative could be excessive because none of the structures is highly contaminated to warrant demolition.	Alternative is easily implemented in practice. Demolition of buildings that are of historical significance may not be possible.	Moderate to high capital.	Not retained for detailed analysis because most buildings are historically significant and no structure is highly contaminated to warrant demolition.
Alternative B4, Option A - Decontamination via Encapsulation	Encapsulation establishes an impenetrable barrier to isolate contaminates from surfaces. At MTL, it would be best used in areas where contaminants are absorbed into material or where surface decontamination methods are not effective.	Encapsulation is readily implemented at MTL except for confined space entry areas. Depending on the type of encapsulation, historical significance of the buildings could be affected.	Moderate capital and low O&M costs.	Not retained for detailed analysis because this method requires long-term monitoring and potential future remediation.

Table 4-2

Screening of Remedial Alternatives for Indoor Areas
U.S. Army Materials Technology Laboratory
(Continued)

Remedial Alternative	Effectiveness	Implementability	Cost	Recommendation
Alternative B4, Option B - Decontamination via Steam Cleaning	Steam cleaning is very effective for surface decontamination. It may not be effective in removing subsurface contamination or contaminants in a nonwater-soluble liquid (e.g., PCB oil residue).	Steam cleaning can be readily implemented. It will generate large quantities of wastewater that will require disposal. Type of disposal will depend on contaminant concentration in the wastewater.	Moderate capital and moderate O&M costs.	Retained for detailed analysis.
Alternative B4, Option C - Grit Blasting	This option is effective for surface decontamination but ineffective for depths greater than 0.5 to 1.5 cm.	Grit blasting is applicable to all surfaces but glass, or Plexiglass. It can create large quantities of dust and may cause structural damage.	Moderate capital and high O&M costs.	Retained for detailed analysis.
Alternative B4, Option D - Strippable Coatings	This should remove all contaminants it contacts but may not work on rough or porous surfaces. Paint removal may be needed prior to application of the coating. Several different coatings may be needed as well as secondary treatment.	This option is easily implemented, but is labor-intensive and can produce large quantities of waste.	Low capital and moderate to high O&M costs.	Not retained for detailed analysis because this method is not as effective as simpler surface methods and provides no advantages over other methods.
Alternative B4, Option E - Fixative/Stabilizer Coatings	Contaminants are not removed but remain in place in a stabilized or immobilized condition. Monitoring of the effectiveness required over the coating lifetime.	Testing may be necessary to determine which coating(s) would be effective. Application of coating is easily implementable.	Moderate to high capital and low O&M costs.	Not retained for detailed analysis as this method requires long-term monitoring and potential future remediation.

Table 4-2

Screening of Remedial Alternatives for Indoor Areas
U.S. Army Materials Technology Laboratory
(Continued)

Remedial Alternative	Effectiveness	Implementability	Cost	Recommendation
Alternative B4, Option F - Dusting/ Vacuuming/Wiping	This is very effective in removing surface contamination. It is not effective for subsurface contamination. It can be used as a pretreatment or secondary treatment technique when combined with other methods.	This option is easily implemented at MTL except for confined space entries.	Low capital and low O&M costs.	Retained for detailed analysis.
Alternative B4, Option G - Hydroblasting/ Water Washing	This is effective for surface contamination but may not be effective on subsurface contamination. This option is not applicable to wood or fiberboard surfaces.	This option is best suited for large open areas. High pressure may cause structural damage. Large quantities of wastewater are generated.	Moderate to high capital and high O&M costs.	Retained for detailed analysis.
Alternative B4, Option H - Scarification	This is effective only on poured concrete or cement. It can remove contaminants to a depth of 2.5 cm.	This option is suited for poured concrete floors. Large amounts of waste will be generated. Surface may require refinishing.	Moderate to high capital and high O&M costs.	Retained for detailed analysis.
Alternative B4, Option I - Drilling and Spalling	This is effective only on poured concrete or cement. It can remove contaminants to a depth of 5 cm.	This option is suited for removal of deep subsurface contamination.	Moderate to high capital and high O&M costs.	Retained for detailed analysis.
Alternative B4, Option J - Solvent Washing	The proper solvent should extract all contaminants it contacts. It may not be effective on porous surfaces or on metal contamination. This option will probably require several applications.	Testing would be required to determine effective solvents. Solvents may require long periods of contact to be effective or may cause contaminants to travel further into materials.	Moderate capital and high O&M costs.	Retained for detailed analysis.

Table 4-2

**Screening of Remedial Alternatives for Indoor Areas
U.S. Army Materials Technology Laboratory
(Continued)**

Remedial Alternative	Effectiveness	Implementability	Cost	Recommendation
Alternative B4, Option K - Alkali or Acid Etching	This option is most effective on metal or wood surfaces. It may not be effective on subsurface contamination.	Paint removal from the surface prior to application may be necessary. Option may cause structural damage and generate large quantities of waste.	Moderate capital and moderate to high O&M costs.	Retained for detailed analysis.
Alternative B4, Option L - Bleaching	This option is most effective on liquid pesticide spills. It is most effective on metal surfaces. It is most often used in conjunction with other decontamination methods.	Hazardous liquids and sludges may be produced. Option is easily implemented at MTL, but pesticide concentrations in indoor areas are not great enough to warrant this type of treatment.	Moderate capital and moderate O&M costs.	Not retained for detailed analysis because pesticide contamination levels not high enough to warrant this type of treatment.
Alternative B5 - Decontamination/ Dismantling of Indoor Areas	This alternative combines the decontamination options of Alternative 4 with dismantling of particulars that are too difficult to decontaminate.	This alternative can be readily implemented at MTL. Dismantled structures may require off-site disposal as hazardous waste. Dismantling should not cause structural damage.	Costs would depend on the decontamination method(s) and the extent of dismantling.	Retained for detailed analysis.

Table 4-3

Remedial Alternatives of Indoor Areas Retained for Detailed Analysis
U.S. Army Materials Technology Laboratory

- Alternative B1 - No Action
- Alternative B2 - Institutional Actions
- Alternative B4 - Decontamination of Indoor Areas
    - Steam Cleaning
    - Grit Blasting
    - Dusting/Vacuuming/Wiping
    - Hydroblasting/Water Washing
    - Scarification
    - Drilling and Spalling
    - Solvent Washing
    - Alkali or Acid Etching
- Alternative B5 - Decontamination/Dismantling of Indoor Areas

SECTION 5

DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

5.1 INTRODUCTION

This section presents the detailed analysis of remedial alternatives previously presented and retained in Section 4 for addressing the contaminated indoor areas at MTL. Four remedial alternatives were retained to provide an appropriate range of options and sufficient information to allow comparison among alternatives.

The remedial alternatives listed below are specific to building interiors and are designated by the letter "B":

- Alternative B1 — No action.
- Alternative B2 — Institutional actions.
- Alternative B4 — Decontamination of indoor areas.
- Alternative B5 — Decontamination/dismantling of indoor areas.

Each alternative is analyzed in detail and evaluated based on cost and noncost criteria. The criteria used are described in Subsection 5.2.

Note that in this section, only Alternatives B1, B2, B4, and B5 are analyzed in detail. Alternative B3 is not analyzed, as it was rejected in the screening process, as described in Section 4.

5.2 ANALYSIS CRITERIA

In accordance with the Massachusetts Contingency Plan (MCP), the following criteria were used to analyze and evaluate each of the remedial alternatives:

- Effectiveness
- Short-term and long-term reliability

- Implementability
- Cost
- Risk
- Benefits
- Timeliness
- Nonpecuniary interests
- Community acceptance

These criteria used for detailed analysis are discussed further in the following subsections, and detailed analyses of the alternatives are presented in Subsections 5.3 through 5.6.

5.2.1 Effectiveness

This criterion is used to determine how each alternative complies with achieving a permanent or temporary solution. This criterion discusses how the alternative reuses, recycles, destroys, detoxifies, or treats the contaminants of concern and to what extent the alternative reduces the levels of contaminants to levels that achieve or approach background.

5.2.2 Short-Term and Long-Term Reliability

This evaluation criterion involves the degree of uncertainty of success for the alternative and the effectiveness of any measures required to manage residues, remaining wastes, discharges, or emissions to the environment.

5.2.3 Implementability

This criterion establishes the technical and administrative feasibility of implementing a technology. Technical aspects evaluated for each technology include construction and operation activities, ease of undertaking additional remedial action, and monitoring after completion of activities. Administrative concerns include establishing contact with appropriate agencies to implement remedial actions (i.e., obtaining permits or approval for construction and operation of a treatment unit). Availability of materials and equipment

needed is another factor that must be considered when evaluating the implementability of a technology.

5.2.4 Cost

This evaluation criterion provides information as to the capital and O&M costs of the alternative. All costs are estimated in 1995 dollars. Capital costs include design, construction, site preparation, equipment, and procurement fees. O&M costs include labor, equipment repair, expendable treatment costs (chemicals), and monitoring. Additional cost considerations include environmental restoration costs such as wetlands, surface waters, and wildlife. These considerations are not applicable for remediation at MTL.

Because of the different site reuse scenarios at MTL, as discussed in Subsection 3.2, each building alternative (except Alternatives B1 and B2) has separate cost tables for each of the three reuse scenarios developed for the site. The site reuse scenarios are as follows:

Scenario 1 - Commercial reuse for Zones 1, 2, and 3; public access for Zone 4 and River Park.

Scenario 2 - Residential reuse for Zones 1, 2, and 3; public access for Zone 4 and River Park.

Scenario 3 - Commercial reuse for Zones 1 and 2; residential reuse for Zone 3; and public access for Zone 4 and River Park.

5.2.5 Risk

Consideration of this evaluation criterion includes the short-term and long-term on-site and off-site risks from excavation, transport, disposal, containment, construction, operation activities, or discharges from remedial systems. This criterion also includes consideration of the potential risk to human health or to the environment by any remaining contaminants after completion of the remedial action.

5.2.6 Benefits

This criterion establishes the benefits of the alternative, including the benefits of restoring natural resources; providing for the productive reuse of the site; avoiding costs of relocating residents, businesses, or utilities; and avoiding lost value of the site.

5.2.7 Timeliness

This criterion establishes the timeliness of the alternative in terms of eliminating any uncontrolled sources of oil and/or hazardous material and achieving a level of no significant risk (achieving remedial cleanup goals).

5.2.8 Nonpecuniary Interests

This assessment evaluates the relative effect of the alternative upon nonpecuniary interests, such as aesthetic values.

5.3 EVALUATION OF ALTERNATIVE B1: NO ACTION

5.3.1 Description of Alternative B1

The no action alternative for indoor areas at MTL provides a baseline for comparing existing conditions with those resulting from implementation of other alternatives. Under this alternative, no action would be taken to decontaminate any of the indoor areas. Because no remedial activities would be implemented under the no action alternative, long-term human health and environment risks from the buildings on the MTL site will remain the same as those identified in the RI. Under this alternative, buildings would be unused and unmaintained. Minimal security would be involved and would be used solely to ensure that the buildings remained unused. Building deterioration over time would likely result from this alternative.

5.3.2 Assessment of Alternative B1

5.3.2.1 Effectiveness

This alternative would not achieve a permanent solution as defined in 310 CMR 40.1000. In this alternative, the contaminants remain on the building surfaces and no measures are taken to mitigate exposure to the surfaces.

5.3.2.2 Short-Term and Long-Term Reliability

This alternative is not successful in mitigating exposure to contaminants. Risks to the community include contact with the various contaminants. These risks would not be mitigated in this alternative. Implementation of the no action alternative would not reduce personnel traffic within the contaminated building areas. The time required to reduce the risk of exposure to contaminants in the buildings through natural, passive processes to an acceptable level is unknown.

In this alternative, there is no active remedial process for building contaminants. As a result, contaminant concentrations would be reduced only by passive, natural processes. Toxicity, mobility, and volume of the contaminated materials may remain at their present values for an extended period of time.

5.3.2.3 Implementability

The no action alternative is easily implemented. Since no remediation in the buildings would be implemented, technical feasibility is not an issue. Monitoring of the condition and integrity of the buildings is routine operation.

5.3.2.4 Cost

The no action alternative has no capital costs. This alternative would have annual operating costs for monitoring. These costs are presented in Table 5-1. The estimated annual cost for this alternative is $6,100.

No environmental restoration is required with this alternative and no damage to natural resources results from its implementation.

5.3.2.5 Risk

The no action alternative will not reduce the short-term human health and environmental risks identified in the RI because the contaminants are not removed or treated and access to exposure is not controlled. Under the no action alternative, long-term monitoring of contaminant conditions and integrity of the structures would be required. The long-term risks would be reduced only through natural, passive processes. Because no contaminant treatment or removal technologies would be implemented, it is possible that contaminants could be spread into other on-site or off-site areas.

5.3.2.6 Benefits

This alternative does not allow for the reuse of the site. Contaminated material would remain such that the cancer risk is higher than 1E-05. There would be no relocation of people, businesses, or utilities necessary for this alternative.

5.3.2.7 Timeliness

Since there are no remedial activities under this alternative, building interior risk is reduced only through natural attenuation and degradation over time. The time required to achieve a level of no significant risk is unknown. The no significant risk level is anticipated to take at least several decades.

Table 5-1

Estimate of Annual Operation and Maintenance Costs for Alternative B1: No Action

Description	Quantity (per year)	Unit Cost ($)	Total Cost ($)
1. Monitoring of the Site Security and the Integrity of the Structures (Monthly Inspections)	96 hrs	35/hr	3,360
2. MCP Review*		lump sum	1,000
3. Subtotal			4,360
4. Administrative (15%)			654
5. Contingency (25%)			1090
6. Annual Total (rounded)			6,100

*MCP reviews conducted every 5 years. This yearly cost is an amortization of 5-year reviews over a 30-year project lifetime.

5.3.2.8 Nonpecuniary Interests

This alternative would have no effect on the current aesthetics of the site.

5.4 EVALUATION OF ALTERNATIVE B2: INSTITUTIONAL ACTIONS

5.4.1 Description of Alternative B2

This institutional actions alternative incorporates all the features of the no action alternative for buildings and indoor areas at MTL along with additional actions that reduce the potential for exposure to indoor contamination. The major components of this alternative are:

- Locking contaminated buildings.
- Installing fences and posting signs around contaminated areas.
- Placing deed restrictions on the property to prevent development of contaminated areas.
- Continuing air monitoring in contaminated areas if areas are not totally restricted to entry.

As in the no action alternative, implementing no remedial activities for indoor areas allows the existing contamination to remain in place. However, the potential for exposure is reduced by isolating the contaminated areas. Contingency plans would have to be developed in the event of damage to the buildings by natural or manmade causes. Unlike Alternative B1, this alternative includes continual building maintenance to guard against deterioration. Utilities would remain active; heating would occur when necessary. This alternative also includes a much greater level of security on the site. Exterior building repair would occur as needed to ensure that the buildings were maintained in good order for possible future reuse (if risk levels were reduced sufficiently). Ground maintenance would also be performed as needed.

5.4.2 Assessment of Alternative B2

5.4.2.1 Effectiveness

In this alternative, the contaminants remain on the building surfaces. This alternative provides for upgraded security and deed restrictions pertaining to the site. These institutional controls would diminish the risk of direct human contact with contaminated building surfaces on-site; however, contaminants will not be treated or contained under this alternative, and therefore, no reduction of contaminants is expected except through natural degradation processes. No contaminated material is recycled, reused, or destroyed by this alternative. This alternative would reduce risk through the institutional actions. The effectiveness of the alternative will depend on the continued implementation of these actions, especially any activity and use limitations placed on the buildings.

5.4.2.2 Short-Term and Long-Term Reliability

Risks to the community include contact with the contaminants. Access restrictions would reduce the risks by reducing contact. Personnel traffic within the contaminated building areas would be reduced. Workers in the contaminated areas during monitoring and sampling activities would be adequately protected. The time required to reduce the risk of exposure to contaminants in the buildings through natural, passive processes to a level of no significant risk is unknown.

In this alternative, there is no active remedial process for building contaminants. As a result, contaminant concentrations would be reduced only by passive, natural processes. Toxicity, mobility, and volume of the contaminated materials may remain at their present values for an extended period of time.

5.4.2.3 Implementability

The alternative is easily implemented. There are no construction requirements. Monitoring of the condition and integrity of the buildings is routine operations. The one part of this

alternative that may be difficult to implement is obtaining the access and use limitations or deed restriction against future development because this would require the approval and cooperation of local agencies.

5.4.2.4 Cost

This alternative has minimal capital costs for locks, signs, fences, etc. These costs are presented in Table 5-2. The estimated capital cost for this alternative is $257,000. The alternative would have annual operating costs for monitoring. These costs are presented in Table 5-3. The estimated annual operating and maintenance cost for this alternative is $553,000.

No environmental restoration is required with this alternative and no damage to natural resources results from its implementation.

5.4.2.5 Risk

This alternative would not result in any additional risk during implementation. The alternative would require long-term monitoring and continued access restrictions to ensure that long-term human health and environmental risks were reduced. This is because the contaminants would not be removed and the effectiveness of the controls would depend on the amount of access restriction and the integrity of the structures. Because no contaminant treatment or removal technologies would be implemented, it is possible that contaminants could be spread into other on-site or off-site areas.

Under this alternative, long-term monitoring of contaminant conditions and integrity of the structures would be required. The contaminant concentrations would be reduced only through natural, passive processes.

Table 5-2

Estimate of Capital Costs for Alternative B2: Institutional Actions

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Closing and Locking Buildings with Contaminated Surfaces	17 bldgs	4,000/bldg	68,000
2. Extending Existing Site Fence	8,200 ft	15/ft	123,000
3. Legal Administration of Deed Restrictions		lump sum	15,000
4. Subtotal			206,000
5. Contingency (25%)			51,500
6. **Total Capital Cost (rounded)**			257,500

Table 5-3

Estimate of Annual Operation and Maintenance Costs for Alternative B2: Institutional Actions

Description	Quantity (per year)	Unit Cost ($)	Total Cost ($)
1. Maintenance of Institutional Actions (5% of Capital Cost)		lump sum	12,875
2. Monitoring of the Site Security and the Integrity of the Structures (Bimonthly Inspections)	480 hrs	35/hr	16,800
3. Grounds Maintenance	416 hrs	35/hr	14,560
4. Utilities (Heating of Buildings)		lump sum	350,000
5. MCP Reviews*		lump sum	1,000
6. Subtotal			395,235
7. Administrative (15%)			59,285
8. Contingency (25%)			98,810
9. **Annual Total (rounded)**			553,000

*MCP reviews conducted every 5 years. This yearly cost is an amortization of 5-year reviews over a 30-year project lifetime.

5.4.2.6 Benefits

This alternative does not allow for the reuse of the contaminated buildings. The risk from contaminated material would remain at higher than 1E-05. There would be no relocation of people, businesses, or utilities necessary for this alternative.

5.4.2.7 Timeliness

Since there are no remedial activities under this alternative, building interior contaminant concentrations are reduced only through natural attenuation and degradation over time. Institutional controls would be required until concentrations were reduced to a level of no significant risk. The time required to achieve a level of no significant risk is unknown. The no significant risk level is not anticipated to be achieved for several decades.

5.4.2.8 Nonpecuniary Interests

The installation of fences, signs, or locks would have minimal effect on the current aesthetics of the site.

5.5 EVALUATION OF ALTERNATIVE B4: DECONTAMINATION OF BUILDINGS

5.5.1 Description of Alternative B4: Decontamination of Buildings

The decontamination alternative involves the decontamination of the building surfaces and indoor areas that have been identified as requiring decontamination. This subsection contains a general discussion of what remedial measures would be used for the different contaminants and indoor surfaces. It also provides a list on a room-by-room basis of what remedial action is required.

The surface contamination that was found during the Phase 2 Remedial Investigation wipe program was described in Subsection 1.2.3. A total of 40 different compounds were found to have exceeded the levels of no significant risk for surface contamination. The

types of contaminants include metals, BNAs, PCBs, pesticides, and explosives. A "hit" is defined where one compound exceeded the cleanup action limits in a wipe location. Many locations contained multiple contaminant hits. These hits occurred on a variety of surfaces, including concrete, concrete block, floor tile, brick, and metal. Tables 5-4 and 5-5 indicate which types of compounds exceeding the limits for commercial and residential reuse standards were found on which surfaces.

In each area to be decontaminated, the following general procedure will be followed:

- Removability study, as necessary (e.g., chip testing to determine depth of contamination).
- Decontamination.
- Confirmatory testing.
- Additional decontamination and testing as necessary.
- Surface repair (e.g., resurfacing concrete, painting).

There are some areas identified as having chemical contamination that have already undergone surface decontamination for the removal of radiological parameters. These areas were previously identified in Subsection 1.2.3. For these areas, the chemical contamination may also have been removed during the radiation decontamination procedures. Before these areas undergo any chemical decontamination, confirmatory testing will be performed to determine if any chemical contamination above cleanup goals remains. If such contamination is still present, the area will undergo decontamination. For any areas in which confirmatory testing does not reveal any contamination above cleanup goals, no further action will be taken.

Some contaminants, such as PCBs, can penetrate deeply into concrete. Chip samples or corings to determine the depth of penetration are recommended where PCB or BNA contamination is present. This will determine the proper decontamination method to use in these areas. The decontamination method that is selected will depend on how deeply the

Table 5-4

Matrix of Contaminants and Surfaces for Commercial Reuse

Surface	Contaminant				
	Metal	BNA	Explosives	PCB	Pesticides
Floor					
Unpainted Concrete	X	X	X	X	X
Painted Concrete	X	X			
Metal	X	X		X	
Tile	X	X		X	
Wood	X	X			
Wall					
Unpainted Brick	X	X			
Painted Brick	X	X		X	
Metal		X			
Unpainted Concrete Block	X	X		X	
Painted Concrete Block	X				
Unpainted Concrete	X				
Painted Concrete		X			
Unpainted Dry Wall	X	X			
Painted Dry Wall	X	X			
I-Beam	X	X		X	
Floor Drain	X	X		X	X
Fume Hood/Exhaust Vent	X	X			

Table 5-5

Matrix of Contaminants and Surfaces for Residential Reuse

Surface	Contaminant				
	Metal	BNA	Explosives	PCB	Pesticides
Floor					
Unpainted Concrete	X	X	X	X	X
Painted Concrete	X	X			X
Metal	X	X		X	X
Tile	X	X		X	X
Wood	X	X			X
Wall					
Unpainted Concrete Block	X	X		X	
Painted Concrete Block	X				
Unpainted Brick	X	X			
Painted Brick	X	X		X	X
Metal	X	X			
Unpainted Concrete	X		X		
Painted Concrete		X			
Unpainted Dry Wall	X	X			X
Painted Dry Wall	X				
Painted Metal			X		
I-Beam	X	X	X	X	X
Floor Drain	X	X		X	X
Fume Hood/Exhaust Vent	X	X			

contaminant has penetrated into the media. Surface or a combination of surface and subsurface decontamination methods will be used. Only surface decontamination is required for removal of metals, explosives, or pesticides.

Following any subsurface sampling, the surface decontamination is performed. The decontamination methods that were evaluated in Section 4 are considered for the contaminants and surfaces found at MTL indoor areas. These methods are:

- Steam Cleaning - Primarily used on non-porous surfaces. It is a safe method for removing explosives contamination. It is not as effective for removing insoluble organic materials, such as PCBs.
- Grit Blasting - Blasting with abrasives, such as sand and dry ice, is used on painted surfaces to remove paint and on all surfaces to remove tightly adhering surface contamination. Shot blasting will remove material from floors and is effective at removing up to 0.5 inches of floor material.
- Dusting/Vacuuming/Wiping - These methods are suitable to almost all contaminants and surfaces. Vacuuming and wiping could be done successively. The vacuuming can remove the surface film, particularly if a solvent or detergent is used.
- Hydroblasting/Water Washing - This method is suitable for cleaning painted surfaces. At higher pressures, the paint can be removed.
- Scarification - This method is suitable for remediating concrete floors that are contaminated with a deeply penetrating material, such as PCBs.
- Drilling/Spalling - This method is suitable for remediating concrete floors that are contaminated with a deeply penetrating material, such as PCBs.
- Solvent Washing - This method is used for cleaning organic contaminants from surfaces.
- Alkali or Acid Etching - This method is suitable for cleaning metal surfaces.

The specific decontamination process in each area will depend on the surface material and contaminants present. As discussed in Section 1, metals contamination is believed to be a thin surface film. The recommended initial decontamination method is vacuuming with a shop vacuum with an ultra-low penetration air (ULPA) filter. This will remove loosely

adhering dust. The vacuuming will be followed by wiping with a detergent or solvent by hand for small areas or applying foam followed by water washing for more extensive areas. Confirmatory testing will be performed to test for achievement of cleanup limits. If the cleanup limits have not been met, a more aggressive method such as grit blasting can be performed. Particular types of grit blasting could be sand or dry ice blasting for walls or shot blasting for floors.

However, if a painted surface continues to have one of the four metals (lead, chromium, barium, and cadmium) that were commonly used as paint additives, then additional aggressive methods should not be performed since control of metals in paint is being performed under a separate program.

BNAs are believed to be present as thin films although it is possible the contaminant may have penetrated into the surfaces. The recommended initial cleaning is to vacuum all surfaces with a shop vacuum with an ULPA filter to remove loose dust. This should be followed by wiping with a detergent or solvent by hand for small areas or applying foam followed by water washing for more extensive areas. If confirmatory testing indicates that the surface contamination is still substantially above the action limit, a more aggressive technique such as grit blasting may be used. See Subsection 6.6 for a discussion of confirmatory sampling.

Explosives are assumed to be dust deposited from firing of weapons and are believed to be present as a thin film on surfaces. The recommended initial cleaning method is steam cleaning to reduce potential safety hazards that may be present if abrasive methods are used. If, as a result of confirmatory wipe sampling, it is determined that additional remediation is necessary, the next step should be wiping with a detergent or solvent by hand or applying foam followed by water washing for more extensive areas.

PCBs may have penetrated deeply into the surfaces. Therefore, more aggressive cleaning must be used for this contaminant. An initial vacuuming is recommended to remove loose debris and dust. This will reduce the likelihood of spreading the PCB contamination during

subsequent steps. Concrete floors should be shot blasted if the PCB penetration is believed to be less than 0.5 inch. If the penetration is believed to be greater than 0.5 inch, then scabbling is a more efficient method. Attempts can be made to decontaminate floor tile, but removal may be necessary. Floor drains should be cleaned by wiping with a solvent or detergent.

Pesticides are believed to exist as a surface film and the recommended remediation is the same as for BNAs, i.e., vacuuming followed by a solvent or detergent washing.

When combinations of contaminants are present on a surface, the recommended decontamination method should be dependent on the contaminant that is the greatest hazard to workers or requires the most aggressive remedial measure. Therefore, the treatment method should be selected based on the following contaminant priority; explosives, PCBs, BNAs, pesticides, metals.

In summary, the initial decontamination for all surfaces and contaminants, except explosives, will be dusting/vacuuming/wiping. The initial decontamination for explosives will be steam cleaning. Secondary decontamination for all contaminants except PCBs would be wiping with a solvent or foam water washing. Secondary treatment for PCBs will be shot blasting, scarification, or drilling/spalling. If additional treatment is required, grit blasting could be used but not for removal of explosives or on any surfaces that would be damaged by this method such as dry wall and floor tile. The logic of the process is illustrated in Figure 5-1 and summarized in Table 5-6.

Prior to full-scale decontamination of the MTL indoor areas, a pilot decontamination study will be performed to determine the effectiveness of the various methods. This pilot decontamination study will select a small number of rooms or building areas. Full decontamination will take place in these areas and rooms to ensure that the selected decontamination methods can achieve the cleanup goals. If the selected methods cannot meet the cleanup goals, additional decontamination methods will be implemented until the cleanup goals are met.

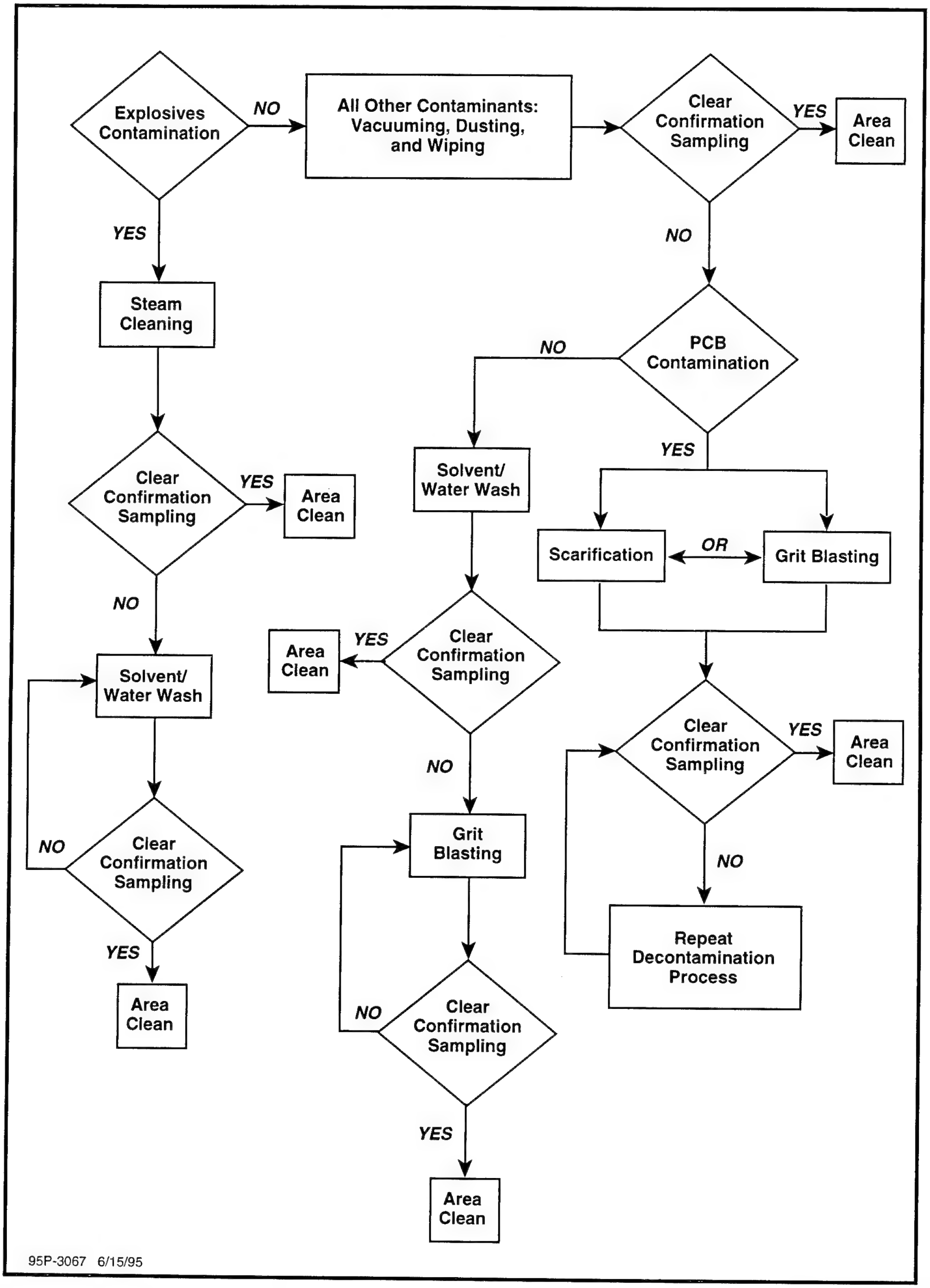


FIGURE 5-1 SEQUENCE OF DECONTAMINATION METHODS

Table 5-6

Preferred Removal Technologies For Each Surface Contaminant Type

Contaminant Type	Primary Removal Technology	Secondary Removal Technology	Tertiary Removal Technology
Explosives	Steam Cleaning	Solvent/Water Wash	
PCBs	Dusting/Vacuuming/ Wiping	Scarification/Shot Blasting/Drilling/Spalling	Grit Blasting
Other Contaminants	Dusting/Vacuuming/ Wiping	Solvent/Water Wash	Grit Blasting

Note: Grit blasting will not be used on tile or dry wall surfaces.

As building areas or rooms are decontaminated, not every surface will require cleaning. The majority of surfaces are either floors or walls. Floors will be cleaned in every room or area that is being decontaminated. Walls would be decontaminated only if contamination was originally found there during the RI sampling. Ceilings and roofs are not to be cleaned. All I-beams in a particular open building will be cleaned if any of the beams were shown to be contaminated. If floor tiles are present, some tiles will be removed and the floor beneath will be sampled during confirmatory sampling.

Tables 5-7 and 5-8 identify all buildings and rooms within buildings that will be decontaminated. Table 5-7 is for surfaces based on commercial building reuse and Table 5-8 is based on residential building reuse. Each table identifies surfaces that will be decontaminated in each area and the decontamination steps to be implemented in each area. The shaded rows in Tables 5-7 and 5-8 represent areas that have undergone previous decontamination for radiological parameters. These areas will be sampled to determine if any additional remediation is required.

After decontamination is completed, confirmatory sampling will be done to ensure that the cleanup goals have been met. If the sampling results exceed the action limits, the decontamination efforts will continue until results are below the levels presented in Table 3-1. If feasible, the surface contamination will be remediated to background. See Subsection 6.6 for a discussion of confirmatory sampling.

Waste generated during decontamination procedures (dust, debris, used filters, used water or solvent, wipe rags, etc.) will be containerized. The waste will be analyzed for hazardous criteria and TCLP. The waste will be disposed of off-site after it is characterized as a hazardous or nonhazardous waste.

As a final step in this alternative, surface repair will take place only if its is required for safety reasons or for the functional requirements of the Army. This may include resurfacing scabbled concrete or painting of walls.

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
36	0.1	Floor/Wall	1			2#	2#
36	0.2	Floor	1			2#	2#
36	0.2	Wall	1		2		3*
36	0.3	Floor/Wall	1			2#	2#
36	0.4	Wall	1			2#	2#
36	102	Floor	1		2		
36	Cafeteria	Floor	1		2		
37	103	Floor	1			2#	2#
37	104	Floor	1		2		3*
37	106	Floor	1		2		3*
37	107	Floor	1			2#	2#
37	108	Floor	1			2#	2#
37	110	Wall	1		2		3*
37	111	Floor	1			2#	2#
37	113	Floor	1		2		3*
37	113A	Floor	1		2		3*
37	115	Floor	1			2#	2#
37	116	Floor	1		2		3*
37	121	Floor	1		2		3*
37	127	Floor	1		2		
37	128	Floor	1		2		
37	201	Wall	1		2		
37	Auto Shop	Floor Drain	1		2		
37	Auto Shop	Floor/Wall	1		2		3*
37	Auto Shop	I-Beam	1			2#	2#
37	Auto Shop	Wall	1		2		3*
37	Battery Storage	Floor/Wall	1		2		3*
37	Equipment Shop	Floor	1			2#	2#
37	Equipment Shop	Wall	1		2		3*
37	Metal Shop	Floor/Wall	1		2		3*
37	Metal Shop	I-Beam	1			2#	2#
37	P/E Storage	Floor	1		2		3*
39	101A	Floor					
39	101B	Floor	1		2		3*
39	104	Floor	1		2		
39	107A	Floor	1		2		
39	107B	Floor	1		2		
39	108	Floor					
39	140	Floor	1		2		
39	140	Fume Hood	1		2		
39	141	Exhaust Vent	1		2		
39	142	Floor					
39	144	Floor	1		2		
39	145	Floor					

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
39	153	Floor/Wall	1		2		
39	155B	Floor/Wall					
39	156	Wall	1		2		
39	159	Floor	1		2		
39	161	Floor	1		2		
39	162	Floor/Wall	1		2		3*
39	163	Floor	1			2#	2#
39	164	Floor	1		2		
39	165	Floor/Wall	1		2		
39	171	Floor	1		2		3*
39	201/202	Floor	1		2		3*
39	201/202	Floor Drain	1		2		
39	206	Floor/Wall	1		2		
39	206	Fume Hood	1		2		
39	207	Floor	1		2		
39	227	Floor/Wall	1		2		
39	243	Floor/Wall	1		2		3*
39	243A	Floor	1		2		3*
39	244	Floor	1		2		3*
39	247	Floor					
39	248	Floor					
39	301	Wall	1		2		3*
39	303A	Floor	1		2		
39	331	Floor/Wall	1		2		
39	331	Fume Hood	1		2		
39	333A	Floor	1		2		
39	403A	Floor	1		2		
39	403A	Fume Hood	1		2		
39	413A	Floor	1		2		
39	403	Floor	1		2		
39	419	Floor	1		2		
39	431	Floor	1		2		
39	450	Floor	1		2		
39	501	Wall					
39	501A	Floor/Wall	1		2		
39	503	Floor					
39	505	Floor	1		2		
39	509	Floor/Wall	1		2		
39	509	Fume Hood	1		2		
39	510	Floor	1		2		
39	512	Floor/Wall					
39	512	Fume Hood					
39	513	Wall					
39	514	Floor/Wall					

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods				
			Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
39	514	Fume Hood					
39	515	Floor/Wall	1		2		
39	521	Floor/Wall	1		2		
39	521	Fume Hood	1		2		
39	529	Wall	1		2		
39	531	Fume Hood	1		2		
39	532	Floor	1		2		
39	537	Floor/Wall	1		2		
39	538	Door Drain	1		2		
39	538	Floor/Wall	1		2		
39	538	Fume Hood	1		2		
39	D	Floor	1		2		
39	E	Floor	1		2		3*
39	E	Wall	1			2#	2#
39	F	Floor	1			2#	2#
43	Entire Bldg.	Floor/Wall					
60	105.1	Floor	1			2#	2#
60	105.3	Floor	1			2#	2#
60	106	Floor	1		2		3*
97	1	Floor	1		2		
97	2(lab)	Floor	1		2		
97	2(mach.)	Wall	1		2		3*
97	143	Floor	1		2		
97	143	Fume Hood	1		2		
97	144	Floor	1		2		
97	146	Floor	1		2		
111	0.1	Floor	1		2		3*
111	3.1	Floor	1		2		3*
117	0.1	Floor	1		2		3*
118	1.1	Floor	1		2		3*
118	1.2	Floor	1		2		3*
131	2	Floor	1		2		3*
131	3	Floor	1		2		3*
131	12	Floor/Wall					
131	39	Floor	1		2		3*
131	39	Floor Drain	1		2		
131	152	Floor/Wall	1		2		
243	1	Floor	1		2		3*
243	1	Floor Drain	1		2		
243	2	Floor Drain	1		2		
243	2	Floor/Wall	1			2#	2#
243	3	Floor	1			2#	2#
243	4	Floor	1		2		3*
245	Bunker-right	Floor		1	2		

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
292	106	Floor	1			2#	2#
292	119	Floor	1		2		
292	120	Floor	1		2		
292	120	Fume Hood	1		2		
292	121	Floor	1		2		
292	122	Floor	1		2		
292	125	Floor	1		2		
292	125	Fume Hood	1		2		
292	128	Floor	1		2		
292	128	Fume Hood	1		2		
292	132	Floor Drain	1		2		
292	132	Floor/Wall	1			2#	2#
292	133	Floor	1		2		
292	134	Floor	1		2		
292	135	Floor	1		2		
292	136	Floor	1		2		
292	137	Floor	1		2		
292	138	Floor	1		2		
292	205	Floor	1		2		
292	206	Wall	1		2		3*
292	209	Floor	1		2		
292	212	Floor	1		2		
292	213	Floor	1		2		
292	226	Floor	1		2		
292	227	Floor	1		2		
292	228	Exhaust Vent	1		2		
292	233	Floor	1		2		
292	235	Floor	1		2		
292	236	Floor	1		2		
292	237	Floor	1		2		
292	239	Floor	1		2		
292	243	Floor	1		2		
292	244	Floor	1		2		
292	244	Wall	1		2		3*
292	247	Floor	1		2		
292	250	Floor	1		2		
311	1	Floor/Wall	1		2		3*
311	3	Floor	1		2		3*
311	4	Floor	1		2		3*
311	5	Floor/Wall	1		2		3*
311	6	Floor/Wall	1		2		3*
311	7	Floor/Wall	1		2		3*
311	8	Floor/Wall	1		2		3*
311	10	Floor/Wall					

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
311	11	Floor/Wall					
311	14	Floor/Wall					
311	19	Floor/Wall					
311	20	Floor/Wall	1		2		3*
311	21	Floor				2#	2#
311	22	Floor	1		2		3*
311	23	Floor	1		2		3*
311	24	Wall	1		2		3*
311	25	Floor/Wall	1		2		3*
311	26	Floor	1		2		3*
311	26	Wall	1		2		
311	27	Floor	1		2		3*
311	28	Floor	1		2		3*
311	30	Floor	1		2		3*
311	31	Floor	1		2		3*
311	31	Wall	1		2		
311	32	Floor					
311	33	Floor	1			2#	2#
311	34	Floor	1		2		3*
311	35	Floor		1	2		
311	37	Floor/Wall	1		2		3*
311	38	Floor	1		2		
311	39	Floor	1		2		
311	100	Floor	1		2		
311	100	Wall	1		2		3*
311	102	Floor	1		2		
311	102	Fume Hood	1		2		
311	104	Floor	1		2		
311	104	Wall	1		2		3*
311	105	Floor	1		2		
311	105	Wall	1		2		3*
311	107	Floor	1		2		
311	109	Floor	1		2		
311	110	Floor	1		2		
311	112	Floor	1		2		
311	IB East Central	I-Beam	1		2		3*
311	IB West Central	I-Beam	1		2		3*
311	IB West End	I-Beam	1		2		3*
311	Mezzanine	Floor					
312	1.2	Floor	1		2		3*
312	1.3	Floor/Wall	1		2		3*
312	1.4	Wall	1		2		3*
312	1.5	Floor		1	2		
312	1.7	Floor	1		2		3*

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
312	3	Floor					
312	3.1	Floor					
312	3.2	Floor/Wall					
312	101	Exhaust Vent					
312	101	Floor					
312	101	Fume Hood					
312	101.1	Floor	1		2		3*
312	102	Floor/Wall					
312	103	Floor					
312	105	Floor					
312	110	Floor					
312	111	Exhaust Vent					
312	111	Floor/Wall					
312	113	Floor					
312	114	Exhaust Vent					
312	114	Floor Drain					
312	114	Floor/Wall					
312	115	Floor					
312	115	Floor Drain					
312	117	Exhaust Vent					
312	117	Floor Drain					
312	117	Floor/Wall					
312	118	Exhaust Vent					
312	118	Floor					
312	120	Floor/Wall					
312	120	Fume Hood					
312	121	Floor					
312	124	Floor					
312	125	Floor					
312	126	Floor					
312	126	Floor Drain					
312	135	Floor/Wall					
312	137	Fume Hood					
312	141	Floor	1		2		
312	142	Floor	1		2		
312	143	Floor	1		2		
312	144	Floor	1		2		
312	145	Floor	1		2		
312	147	Floor	1		2		
312	199	Floor	1		2		
312	199	I-Beam	1			2#	2#
312	199.1	Floor	1		2		
313	0.2	Floor		1	2		
313	0.2	Wall	1		2		3*

Table 5-7
Order of Decontamination Methods on a Section-by-Section Basis
Commercial Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
313	0.3	Floor/Wall	1		2		3*
313	0.4	Floor	1		2		3*
313	0.6	Floor		1	2		
313	0.6	Wall	1		2		3*
313	0.7	Floor		1	2		
313	0.7	Wall	1		2		3*
313	0.8	Floor		1	2		
313	0.8	Wall	1		2		3*
313	0.9	Floor	1		2		3*
313	1.1	Floor/Wall	1		2		3*
313	1.4	Floor	1		2		3*
313	1.5	Floor/Wall	1		2		3*
313	1.5	I-Beam	1		2		3*
313	119	Floor	1		2		
313	125	Floor	1		2		3*
313	125	Fume Hood	1		2		
313	126	Floor	1		2		
313	129	Floor	1		2		
313	138	Floor/Wall	1		2		3*
313	138.1	Floor	1		2		
313	138A	Floor	1		2		
313	152	Floor	1		2		
313	153	Floor	1		2		
313	193	Floor	1		2		
313	194	Floor	1		2		
313	194	Wall	1		2		3*
313	195	Floor	1		2		3*
313	195	Fume Hood	1		2		
313	196	Floor	1		2		3*
313	222	Fume Hood	1		2		
313	227	Fume Hood	1		2		
313	227	Wall	1		2		3*
313	258	Floor	1		2		

- Technology used will depend on penetration of contaminants.
* - This step will be done if necessary; if the floor is tile or wall is drywall, grit blasting will not be attempted.
Shaded areas are those that have undergone previous decontamination for radiological parameters.
These areas will be sampled to determine if any additional remediation is required.

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
36	0.1	Floor/Wall	1			2#	2#
36	0.2	Floor	1			2#	2#
36	0.2	Wall	1			2#	2#
36	0.3	Floor/Wall	1			2#	2#
36	0.4	Wall	1			2#	2#
36	102	Floor	1		2		
36	102	Wall	1		2		3*
36	Auditorium	Floor	1			2#	2#
36	Cafeteria	Floor	1		2		
36	Library	Wall	1		2		3*
37	103	Floor	1			2#	2#
37	104	Floor	1		2		3*
37	106	Floor	1		2		3*
37	107	Floor	1			2#	2#
37	107	Wall	1		2		3*
37	108	Floor	1			2#	2#
37	110	Wall	1		2		3*
37	111	Floor	1			2#	2#
37	113	Floor/Wall	1		2		3*
37	113A	Floor/Wall	1		2		3*
37	115	Floor	1			2#	2#
37	115	Wall	1		2		3*
37	116	Floor/Wall	1		2		3*
37	121	Floor	1		2		3*
37	127	Floor	1		2		
37	128	Floor	1		2		
37	201	Wall	1		2		
37	Auto Shop	Floor Drain	1		2		
37	Auto Shop	Floor/Wall	1		2		3*
37	Auto Shop	I-Beam	1			2#	2#
37	Auto Shop	Wall	1		2		3*
37	Battery Storage	Floor/Wall	1		2		3*
37	Equipment Shop	Floor	1			2#	2#
37	Equipment Shop	Wall	1		2		3*
37	Garage	Floor	1		2		3*
37	Metal Shop	Floor/Wall	1		2		3*
37	Metal Shop	I-Beam	1			2#	2#
37	P/E Storage	Floor/Wall	1		2		3*
39	101A	Floor					
39	101B	Floor	1		2		3*
39	104	Floor	1		2		
39	107A	Floor	1		2		
39	107A	Wall	1		2		3*
39	107B	Floor	1		2		
39	108	Floor					
39	113	Floor	1		2		3*

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
39	140	Floor	1		2		
39	140	Fume Hood	1		2		
39	141	Exhaust Vent	1		2		
39	141	Floor/Wall	1		2		
39	142	Floor					
39	144	Floor	1		2		
39	144	Wall	1		2		3*
39	145	Floor					
39	145	Fume Hood					
39	146	Floor	1		2		
39	146	Wall	1		2		3*
39	153	Floor/Wall	1		2		
39	155B	Floor/Wall					
39	156	Wall	1		2		
39	159	Floor	1		2		
39	159	Wall	1		2		3*
39	161	Floor	1		2		
39	162	Floor/Wall	1		2		3*
39	163	Floor	1			2#	2#
39	164	Floor	1		2		
39	165	Floor/Wall	1		2		
39	171	Floor	1		2		3*
39	201/202	Floor	1		2		3*
39	201/202	Floor Drain	1		2		
39	206	Floor/Wall	1		2		
39	206	Fume Hood	1		2		
39	207	Floor	1		2		
39	227	Floor/Wall	1		2		
39	236A	Floor	1		2		
39	243	Floor/Wall	1		2		3*
39	243A	Floor/Wall	1		2		3*
39	244	Floor	1		2		3*
39	247	Floor/Wall					
39	248	Floor					
39	301	Wall	1		2		3*
39	301B	Fume Hood	1		2		
39	303A	Floor	1		2		
39	328	Floor	1		2		
39	329	Floor	1		2		
39	331	Floor/Wall	1		2		
39	331	Fume Hood	1		2		
39	332	Floor	1		2		
39	332	Fume Hood	1		2		
39	333A	Floor	1		2		
39	403	Floor	1		2		
39	403	Wall	1		2		3*

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
39	403A	Floor/Wall	1		2		
39	403A	Fume Hood	1		2		
39	413	Floor	1		2		
39	413A	Floor	1		2		
39	419	Floor	1		2		
39	431	Floor	1		2		
39	448	Floor	1		2		
39	450	Floor	1		2		
39	453	Floor	1		2		
39	501	Wall					
39	501A	Floor/Wall	1		2		
39	503	Floor					
39	505	Floor	1		2		
39	506	Floor	1		2		
39	509	Floor/Wall	1		2		
39	509	Fume Hood	1		2		
39	510	Floor	1		2		
39	512	Floor/Wall					
39	512	Fume Hood					
39	513	Floor/Wall					
39	514	Floor/Wall					
39	514	Fume Hood					
39	515	Floor/Wall	1		2		
39	521	Floor/Wall	1		2		
39	521	Fume Hood	1		2		
39	529	Exhaust Vent	1		2		
39	529	Fume Hood	1		2		
39	529	Wall	1		2		
39	531	Floor/Wall	1		2		
39	531	Fume Hood	1		2		
39	532	Floor	1		2		
39	534	Fume Hood	1		2		
39	537	Floor/Wall	1		2		
39	538	Floor Drain	1		2		
39	538	Floor/Wall	1		2		
39	538	Fume Hood	1		2		
39	D	Floor	1		2		
39	D	Wall	1		2		3*
39	E	Floor	1		2		3*
39	E	Wall	1			2#	2#
39	F	Floor	1			2#	2#
43	Entire Bldg.	Floor/Wall					
60	105.1	Floor	1			2#	2#
60	105.3	Floor	1			2#	2#
60	105.3	Floor Drain	1		2		
60	106	Floor	1		2		3*

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
97	1	Floor	1		2		
97	2(lab)	Floor	1		2		
97	2(mach.)	Wall	1		2		3*
97	143	Floor	1		2		
97	143	Fume Hood	1		2		
97	144	Floor	1		2		
97	144	Fume Hood	1		2		
97	145	Floor	1		2		
97	146	Floor	1		2		
97	146	Fume Hood	1		2		
97	Attic	Exhaust Vent	1		2		
111	0.1	Floor	1		2		3*
111	3.1	Floor	1		2		3*
117	0.1	Floor	1		2		3*
118	1.1	Floor	1		2		3*
118	1.2	Floor	1		2		3*
131	2	Floor	1		2		3*
131	3	Floor	1		2		3*
131	12	Floor/Wall					
131	39	Floor	1		2		3*
131	39	Floor Drain	1		2		
131	152	Floor/Wall	1		2		
243	1	Floor	1		2		3*
243	1	Floor Drain	1		2		
243	2	Floor Drain	1		2		
243	2	Floor/Wall	1			2#	2#
243	3	Floor	1			2#	2#
243	4	Floor/Wall	1		2		3*
245	Bunker-left	Floor		1	2		
245	Bunker-right	Floor		1	2		
292	106	Floor/Wall	1			2#	2#
292	119	Floor	1		2		
292	120	Floor	1		2		
292	120	Fume Hood	1		2		
292	121	Floor	1		2		
292	122	Floor	1		2		
292	125	Floor	1		2		
292	125	Floor Drain	1		2		
292	125	Fume Hood	1		2		
292	125	Wall	1		2		3*
292	128	Floor	1		2		
292	128	Fume Hood	1		2		
292	132	Floor Drain	1		2		
292	132	Floor/Wall	1			2#	2#
292	133	Floor	1		2		
292	134	Floor	1		2		

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods				
			Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
292	135	Floor	1		2		
292	136	Floor	1		2		
292	137	Floor	1		2		
292	138	Floor	1		2		
292	205	Floor	1		2		
292	205	Wall	1		2		3*
292	206	Wall	1		2		3*
292	209	Floor	1		2		
292	212	Floor	1		2		
292	213	Floor	1		2		
292	226	Floor	1		2		
292	227	Floor	1		2		
292	228	Exhaust Vent	1		2		
292	233	Floor	1		2		
292	235	Floor	1		2		
292	235	Fume Hood	1		2		
292	236	Floor	1		2		
292	237	Floor	1		2		
292	239	Floor	1		2		
292	243	Floor	1		2		
292	244	Floor	1		2		
292	244	Wall	1		2		3*
292	245	Fume Hood	1		2		
292	247	Floor	1		2		
292	250	Floor	1		2		
292	250	Wall	1		2		3*
311	1	Floor/Wall	1		2		3*
311	3	Floor	1		2		3*
311	4	Floor	1		2		3*
311	5	Floor/Wall	1		2		3*
311	6	Floor/Wall	1		2		3*
311	7	Floor/Wall	1		2		3*
311	8	Floor/Wall	1		2		3*
311	10	Floor/Wall					
311	11	Floor/Wall					
311	14	Floor/Wall					
311	19	Floor/Wall					
311	20	Floor/Wall	1		2		3*
311	21	Floor				2#	2#
311	22	Floor	1		2		3*
311	23	Floor	1		2		3*
311	24	Floor/Wall	1		2		3*
311	25	Floor/Wall	1		2		3*
311	26	Floor	1		2		3*
311	26	Wall	1		2		
311	27	Floor	1		2		3*

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
311	28	Floor	1		2		3*
311	30	Floor	1		2		3*
311	31	Floor	1		2		3*
311	31	Wall	1		2		
311	32	Floor					
311	33	Floor	1			2#	2#
311	34	Floor/Wall	1		2		3*
311	35	Floor		1	2		
311	37	Floor/Wall	1		2		3*
311	38	Floor	1		2		
311	39	Floor	1		2		
311	100	Floor	1		2		
311	100	Wall	1		2		3*
311	102	Floor	1		2		
311	102	Fume Hood	1		2		
311	102	Wall	1		2		3*
311	104	Floor	1		2		
311	104	Wall	1		2		3*
311	105	Floor	1		2		
311	105	Wall	1		2		3*
311	107	Floor	1		2		
311	107	Fume Hood	1		2		
311	109	Floor	1		2		
311	110	Floor	1		2		
311	112	Floor	1		2		
311	IB East	I-Beam	1		2		3*
311	IB East Central	I-Beam	1		2		3*
311	IB West Central	I-Beam		1	2		
311	IB West End	I-Beam		1	2		
311	Mezzanine	Floor					
312	1.2	Floor	1		2		3*
312	1.3	Floor		1	2		
312	1.3	Wall	1		2		3*
312	1.4	Floor		1	2		
312	1.4	Wall	1		2		3*
312	1.5	Floor		1	2		
312	1.7	Floor		1	2		
312	3	Floor					
312	3.1	Floor					
312	3.2	Floor/Wall					
312	101	Exhaust Vent					
312	101	Floor					
312	101	Fume Hood					
312	101.1	Floor		1	2		
312	102	Floor/Wall					
312	103	Floor					

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods: Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
312	105	Floor					
312	110	Floor					
312	111	Exhaust Vent					
312	111	Floor/Wall					
312	113	Floor					
312	114	Exhaust Vent					
312	114	Floor Drain					
312	114	Floor/Wall					
312	115	Floor Drain					
312	115	Floor/Wall					
312	117	Exhaust Vent					
312	117	Floor Drain					
312	117	Floor/Wall					
312	118	Exhaust Vent					
312	118	Floor					
312	120	Floor/Wall					
312	120	Fume Hood					
312	121	Floor/Wall					
312	124	Floor					
312	125	Floor					
312	126	Floor					
312	126	Floor Drain					
312	135	Floor/Wall					
312	137	Floor/Wall					
312	137	Fume Hood					
312	141	Floor	1		2		
312	142	Floor/Wall	1		2		
312	143	Floor	1		2		
312	144	Floor	1		2		
312	145	Floor	1		2		
312	147	Floor	1		2		
312	199	Floor	1		2		
312	199	I-Beam	1			2#	2#
312	199.1	Floor	1		2		
312	199.1	Fume Hood	1		2		
313	0.2	Floor		1	2		
313	0.2	Wall	1		2		3*
313	0.3	Floor/Wall	1		2		3*
313	0.4	Floor	1		2		3*
313	0.5	Wall	1		2		3*
313	0.6	Floor		1	2		
313	0.6	Wall	1		2		3*
313	0.7	Floor		1	2		
313	0.7	Wall		1	2		
313	0.8	Floor		1	2		
313	0.8	Wall		1	2		

Table 5-8
Order of Decontamination Methods on a Section-by-Section Basis
Residential Building Reuse
(continued)

Building	Room	Surface	Decontamination Methods				
			Vacuuming, Dusting, and Wiping	Steam Cleaning	Solvent/ Water Wash	Scarification or Drilling/ Spalling	Grit Blasting
313	0.9	Floor	1		2		3*
313	1.1	Floor/Wall	1		2		3*
313	1.2	Wall	1		2		3*
313	1.3	Floor	1		2		3*
313	1.3	Fume Hood	1		2		
313	1.4	Floor	1		2		3*
313	1.5	Floor/Wall	1		2		3*
313	1.5	I-Beam	1		2		3*
313	119	Floor	1		2		
313	125	Floor	1		2		3*
313	125	Fume Hood	1		2		
313	126	Floor	1		2		
313	126	Fume Hood	1		2		
313	126	Wall	1		2		3*
313	129	Floor	1		2		
313	138	Floor/Wall	1		2		3*
313	138.1	Floor	1		2		
313	138A	Floor	1		2		
313	152	Floor	1		2		
313	153	Floor	1		2		
313	193	Floor	1		2		
313	194	Floor	1		2		
313	194	Wall	1		2		3*
313	195	Floor	1		2		3*
313	195	Fume Hood	1		2		
313	196	Floor/Wall	1		2		3*
313	222	Fume Hood	1		2		
313	227	Fume Hood	1		2		
313	227	Wall	1		2		3*
313	250	Wall	1		2		3*
313	253	Wall	1		2		3*
313	258	Floor	1		2		

- Technology used will depend on penetration of contaminants.
* - This step will be done if necessary; if the floor is tile or wall is drywall, grit blasting will not be attempted.
Shaded areas are those that have undergone previous decontamination for radiological parameters.
These areas will be sampled to determine if any additional remediation is required.

5.5.2 Assessment of Alternative B4

5.5.2.1 Effectiveness

This alternative would be a permanent solution as defined in the MCP. While contaminants are not treated in the decontamination process, they are removed from the building surfaces. The methods could produce large quantities of waste materials which would be collected and disposed of off-site in accordance with regulations. Decontamination methods would continue until the building surfaces have achieved the desired cleanup goals as presented in Subsection 3.2.1.

5.5.2.2 Short-Term and Long-Term Reliability

All waste generated during decontamination will be containerized and stored in a manner that will meet RCRA requirements for hazardous waste storage. The wastes will be sampled and analyzed to determine if they are hazardous or not. If the wastes are hazardous, they will be disposed of off-site according to proper hazardous waste disposal procedures. If the wastes are nonhazardous, they will be properly disposed of off-site in a nonhazardous waste landfill.

Workers decontaminating the indoor areas at MTL will wear Level C protective equipment, if necessary, to protect themselves from the contaminated dusts and mists. In addition, workers doing steam cleanup will wear appropriate clothing for protection against steam burns. Workers performing scarification or grit blasting will wear hearing protection. All decontamination workers will be monitored for heat stress.

To protect the community and the environment from any dust or mist generated from decontamination, plastic sheeting and other moisture barriers will be used to contain fugitive dusts and mists. Condensate from steam cleaning will be collected and containerized. All wastes generated from decontamination will be properly disposed of to minimize any potential adverse environmental impact.

The decontamination alternative will provide adequate protection from the building contaminants. As contaminants are removed from the surfaces, the human potential for exposure through ingestion, inhalation, or absorption is reduced or eliminated. The decontamination alternative will prevent the spread of contaminants and is thus protective of the environment. The risk to human health and the environment is reduced by the decontamination of the building surfaces. This alternative will be effective in eliminating contaminants since decontamination will continue until the cleanup goals are achieved.

5.5.2.3 Implementability

Since it uses common cleaning techniques, dusting/vacuuming/wiping is easily implemented. ULPA filter vacuums, cloths or wipes, water, containers for packaging contaminated materials, and Level C protective gear are readily available. In addition, no specialists are required to implement dusting/vacuuming/wiping. Finally, fugitive dusts created by the dusting or vacuuming action may spread contamination. However, this exposure pathway will be adequately monitored and controlled if necessary.

Since steam cleaning is a relatively inexpensive and simple technique, it is easily implemented. Commercial-scale steam cleaners are readily available along with spray and collection systems and personal protective equipment. Personnel to operate steam cleaners are also available.

The solvent or water wash is also a common technique and can be readily implemented. Level C protective gear will be worn during this operation.

Grit blasting, if necessary to implement, is a widely used surface decontamination technique and is easily implemented. Blast guns, pressure lines, abrasive material, air compressors, debris/dust collection systems, cleanup equipment, and protective gear are readily available. Personnel to operate grit blasting equipment are available. Grit blasting can generate large amounts of dust and debris. This exposure pathway, however, will be controlled and adequately monitored.

No environmental restoration is required with this alternative and no damage to natural resources results from its implementation.

5.5.2.4 Cost

It is assumed that all decontamination equipment for this alternative will be purchased. Due to its short duration for implementation, all costs are considered operating costs for the various decontamination methods. These costs are presented for each reuse scenario. Also, since it is unknown whether grit blasting will be necessary, each overall cost was determined twice: once including grit blasting and once not including grit blasting. The costs are presented in Tables 5-9 through 5-14. In the table for each decontamination method, estimates of surface area to be decontaminated and rate of decontamination have been provided. Only the areas requiring remediation were used for the cost estimate. Areas not sampled are not included in the cost estimate. It should be noted that although these costs include confirmation sampling of areas previously decontaminated for radiation, they do not include remediation of these surfaces. The estimated costs may increase up to 30% if such areas will require chemical remediation.

5.5.2.5 Risk

The short-term risks apply only to site workers. Decontamination workers will wear Level C protective equipment, if necessary, to protect themselves from generated dusts or mists.

The decontamination alternative will reduce the long-term human health and environmental risks identified in the RI for buildings and indoor areas. This reduction will occur because contamination, both surface and subsurface, is being treated or reduced to levels consistent with background or to a level of no significant risk.

The decontamination alternative will significantly reduce the toxicity, mobility, and volume of contaminants within the indoor buildings. This alternative however, may not reduce the

Table 5-9
Estimate of Operating Costs for Alternative B4 : Decontamination of Buildings for Reuse Scenario 1 - Commercial Reuse (Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	291,215 ft^2		
Labor (decontamination rate 75 ft^2/hr)	3,883 hrs	41 \hr	159,203
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	815 lb	0.15 \lb	122
Personal Protective Equipment	485 days	60 \day	29,100
Subtotal (a)			192,925
b. Foaming Agent[2]	262,920 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	2,827 hrs	41 \hr	115,907
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	353 days	400 \day	141,200
Waste Generated (.14 gal/ft^2)	36,809 gal	2.50 \gal	92,023
Personal Protective Equipment	353 days	60 \day	21,180
Subtotal (b)			373,910
c. Gritblasting Walls and Floors[3]	201,490 ft^2		
Labor (decontamination rate - 16 ft^2/hr)	12,593 hrs	41 \hr	516,313
Equipment Cost - Purchase	2 ea	1,000 ea	2,000
Waste Generated (12 lb/ft^2)	1,209 ton	300 \ton	362,700
Personal Protective Equipment	1,574 days	60 \day	94,440
Subtotal (c)			975,453
d. Steam Cleaning[4]	7,725 ft^2		
Labor (decontamination rate 66 ft^2/hr)	117 hrs	41 \hr	4,797
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	4,635 gal	2 \gal	9,270
Personal Protective Equipment	15 days	60 \day	900
Subtotal (d)			16,967
3. Utilities (reimbursement to Army)			800,000
4. Subtotal 1 (1, 2 and 3)			**2,659,255**

Table 5-9
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 1 - Commercial Reuse
(Including Costs for Grit Blasting)
(continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
5. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			850,962
6. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			585,036
7. **Verification Sampling**			
Sample Laboratory Analysis	2,000 samples	500 \sample	1,000,000
Labor (5 samples/hr)	400 hr	65 \hr	26,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (7)			1,064,000
8. **Subtotal 2**			**5,159,252**
9. Administration and Profit (15% of Subtotal 2)			773,888
10. **Subtotal 3**			**5,933,140**
11. Contingency (25% of Subtotal 3)			1,483,285
12. Government Construction Management (7.5 % of Subtotal 3)			444,986
13. **Total Cost (Rounded)**			**7,861,000**

[1] - Total area excluding areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total vacuumed area excluding areas containing materials considered not suitable for grit blasting (i.e., floor tile and dry wall).

[4] - Total area containing explosives.

ls - lump sum

Table 5-10
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 1 - Commercial Reuse
(Not Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	291,215 ft^2		
Labor (decontamination rate 75 ft^2/hr)	3,883 hrs	41 \hr	159,203
Equipment Cost	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	815 lb	0.15 \lb	122
Personal Protective Equipment	485 days	60 \day	29,100
Subtotal (a)			192,925
b. Foaming Agent[2]	262,920 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	2,827 hrs	41 \hr	115,911
Equipment Cost	1 ea	3,600 ea	3,600
Materials	353 days	400 \day	141,200
Waste Generated (.14 gal/ft^2)	36,809 gal	2.50 \gal	92,023
Personal Protective Equipment	353 days	60 \day	21,180
Subtotal (b)			373,914
c. Steam Cleaning[3]	7,725 ft^2		
Labor (decontamination rate 66 ft^2/hr)	117 hrs	41 \hr	4,797
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (0.6 gal/ft^2)	4,635 gal	2 \gal	9,270
Personal Protective Equipment	15 days	60 \day	900
Subtotal (c)			16,967
3. Utilities (reimbursement to Army)		lump sum	800,000
4. Subtotal 1 (1, 2 and 3)			**1,683,806**
5. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			538,818
6. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			370,437
7. Verification Sampling			
Sample Laboratory Analysis	2,000 samples	500 \sample	1,000,000
Labor (5 samples/hr)	400 hrs	65 \hr	26,000
Equipment Cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (7)			1,064,000
8. Subtotal 2			**3,657,061**
9. Administration and Profit (15% of Subtotal 2)			548,559
10. Subtotal 3			**4,205,620**
11. Contingency (25% of Subtotal 3)			1,051,405
12. Government Construction Management (7.5 % of Subtotal 3)			315,422
13. Total Cost (Rounded)			**5,572,000**

[1] - Total area excluding areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total area containing explosives.

ls - lump sum

Table 5-11
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 2 - Residential Reuse
(Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	323,340 ft^2		
Labor (decontamination rate 75 ft^2/hr)	4,311 hrs	41 \hr	176,751
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	905 lb	0.15 \lb	136
Personal Protective Equipment	539 days	60 \day	32,340
Subtotal (a)			213,727
b. Foaming Agent[2]	288,465 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	3,102 hrs	41 \hr	127,182
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	388 days	400 \day	155,200
Waste Generated (.14 gal/ft^2)	40,385 gal	2.50 \gal	100,963
Personal Protective Equipment	388 days	60 \day	23,280
Subtotal (b)			410,225
c. Gritblasting Walls and Floors[3]	225,850 ft^2		
Labor (decontamination rate - 16 ft^2/hr)	14,116 hrs	41 \hr	578,756
Equipment Cost - Purchase	2 ea	1,000 ea	2,000
Waste Generated (12 lb/ft^2)	1,355 ton	300 \ton	406,500
Personal Protective Equipment	1,765 days	60 \day	105,900
Subtotal (c)			1,093,156
d. Steam Cleaning[4]	13,630 ft^2		
Labor (decontamination rate 66 ft^2/hr)	207 hrs	41 \hr	8,487
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	8,178 gal	2 \gal	16,356
Personal Protective Equipment	26 days	60 \day	1,560
Subtotal (d)			28,403
3. Utilities (reimbursement to Army)		lump sum	800,000
4. Subtotal 1 (1, 2 and 3)			**2,845,510**

Table 5-11
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 2 - Residential Reuse
(Including Costs for Grit Blasting)
(continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
5. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			910,563
6. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			626,012
7. **Verification Sampling**			
Sample Laboratory Analysis	3,000 samples	500 \sample	1,500,000
Labor (5 samples/hr)	600 hr	65 \hr	39,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (7)			1,577,000
8. **Subtotal 2**			**5,959,086**
9. Administration and Profit (15%) of Subtotal 2)			893,863
10. **Subtotal 3**			**6,852,949**
11. Contingency (25% of Subtotal 3)			1,713,237
12. Government Construction Management (7.5 % of Subtotal 3)			513,971
13. **Total Cost (Rounded)**			**9,080,000**

[1] - Total area excluding areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total vacuumed area excluding areas containing materials considered not suitable for grit blasting (i.e., floor tile and dry wall).

[4] - Total area containing explosives.

ls - lump sum

Table 5-12
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 2 - Residential Reuse
(Not Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	323,340 ft^2		
Labor (decontamination rate 75 ft^2/hr)	4,311 hrs	41 \hr	176,751
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	905 lb	0.15 \lb	136
Personal Protective Equipment	539 days	60 \day	32,340
Subtotal (a)			213,727
b. Foaming Agent[2]	288,465 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	3,102 hrs	41 \hr	127,182
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	388 days	400 \day	155,200
Waste Generated (.14 gal/ft^2)	40,385 gal	3 \gal	100,963
Personal Protective Equipment	388 days	60 \day	23,280
Subtotal (b)			410,225
c. Steam Cleaning[3]	13,630 ft^2		
Labor (decontamination rate 66 ft^2/hr)	207 hrs	41 \hr	8,487
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	8,178 gal	2 \gal	16,356
Personal Protective Equipment	26 days	60 \day	1,560
Subtotal (c)			28,403
3. Utilities (reimbursement to Army)		lump sum	800,000
4. **Subtotal 1 (1, 2 and 3)**			**1,752,354**
5. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			560,753
6. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			385,518
7. **Verification Sampling**			
Sample Laboratory Analysis	3,000 samples	500 \sample	1,500,000
Labor (5 samples/hr)	600 hrs	65 \hr	39,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (7)			1,577,000
8. **Subtotal 2**			**4,275,626**
9. Administration and Profit (15%) of Subtotal 2)			641,344
10. **Subtotal 3**			**4,916,969**
11. Contingency (25% of Subtotal 3)			1,229,242
12. Government Construction Management (7.5 % of Subtotal 3)			368,773
13. **Total Cost (Rounded)**			**6,515,000**

[1] - Total area excluding areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total area containing explosives.

ls - lump sum

Table 5-13
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 3 - Mixed Commercial/Residential Reuse
(Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	299,995 ft^2		
Labor (decontamination rate 75 ft^2/hr)	4,000 hrs	41 \hr	164,000
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	840 lb	0.15 \lb	126
Personal Protective Equipment	500 days	60 \day	30,000
Subtotal (a)			198,626
b. Foaming Agent[2]	271,700 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	2,922 hrs	41 \hr	119,802
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	365 days	400 \day	146,000
Waste Generated (.14 gal/ft^2)	38,038 gal	2.50 \gal	95,095
Personal Protective Equipment	365 days	60 \day	21,900
Subtotal (b)			386,397
c. Gritblasting Walls and Floors[3]	210,270 ft^2		
Labor (decontamination rate - 16 ft^2/hr)	13,142 hrs	41 \hr	538,822
Equipment Cost - Purchase	2 ea	1,000 ea	2,000
Waste Generated (12 lb/ft^2)	1,262 ton	300 \ton	378,600
Personal Protective Equipment	1,643 days	60 \day	98,580
Subtotal (c)			1,018,002
d. Steam Cleaning[4]	9,225 ft^2		
Labor (decontamination rate 66 ft^2/hr)	140 hrs	41 \hr	5,740
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	5,535 gal	2 \gal	11,070
Personal Protective Equipment	18 days	60 \day	1,080
Subtotal (d)			19,890
3. Utilities (reimbursement to Army)		lump sum	800,000
4. Subtotal 1 (1, 2 and 3)			**2,722,915**

Table 5-13
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 3 - Mixed Commercial/Residential Reuse
(Including Costs for Grit Blasting)
(continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
5. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			871,333
6. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			599,041
7. **Verification Sampling**			
Sample Laboratory Analysis	2,400 samples	500 \sample	1,200,000
Labor (5 samples/hr)	480 hr	65 \hr	31,200
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
			1,269,200
8. **Subtotal 2**			**5,462,489**
9. Administration and Profit (15%) of Subtotal 2)			819,373
10. **Subtotal 3**			**6,281,862**
11. Contingency (25% of Subtotal 3)			1,570,466
12. Government Construction Management (7.5 % of Subtotal 3)			471,140
13. **Total Cost (Rounded)**			**8,323,000**

[1] - Total area excluding areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total vacuumed area excluding areas containing materials considered not suitable for grit blasting (i.e., floor tile and dry wall).

[4] - Total area containing explosives.

ls - lump sum

Table 5-14
Estimate of Operating Costs for Alternative B4 :
Decontamination of Buildings for Reuse Scenario 3 - Mixed Commercial/Residential Reuse
(Not Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	299,995 ft^2		
Labor (decontamination rate 75 ft^2/hr)	4,000 hrs	41 \hr	164,000
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	840 lb	0.15 \lb	126
Personal Protective Equipment	500 days	60 \day	30,000
Subtotal (a)			198,626
b. Foaming Agent[2]	271,700 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	2,922 hrs	41 \hr	119,802
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	365 days	400 \day	146,000
Waste Generated (.14 gal/ft^2)	38,038 gal	2.50 \gal	95,095
Personal Protective Equipment	365 days	60 \day	21,900
Subtotal (b)			386,397
c. Steam Cleaning[3]	9,225 ft^2		
Labor (decontamination rate 66 ft^2/hr)	140 hrs	41 \hr	5,740
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	5,535 gal	2 \gal	11,070
Personal Protective Equipment	18 days	60 \day	1,080
Subtotal (d)			19,890
3. Utilities (reimbursement to Army)		lump sum	800,000
4. **Subtotal 1 (1, 2 and 3)**			**1,704,913**
5. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			545,572
6. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			375,081
7. **Verification Sampling**			
Sample Laboratory Analysis	2,400 samples	500 \sample	1,200,000
Labor (5 samples/hr)	480 hrs	65 \hr	31,200
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
			1,269,200
8. **Subtotal 2**			**3,894,766**
9. Administration and Profit (15%) of Subtotal 2)			584,215
10. **Subtotal 3**			**4,478,981**
11. Contingency (25% of Subtotal 3)			1,119,745
12. Government Construction Management (7.5 % of Subtotal 3)			335,924
13. **Total Cost (Rounded)**			**5,935,000**

[1] - Total area excluding areas containing explosives.
[2] - Total vacuumed area excluding areas containing PCBs.
[3] - Total area containing explosives.
ls - lump sum

toxicity of the contaminants because the contaminants are not destroyed, but removed, from the building materials. This alternative will create the following types of waste:

- Used cloths and wiping materials.
- Contaminated dust and debris.
- Used UPLA filters.
- Water from steam cleaning or water washing.
- Used abrasive material and grit blasting washwaters (assuming grit blasting is needed).

These waste items will all be properly disposed of, but may remain toxic. Their mobility will be reduced when they are properly disposed of.

This alternative is irreversible because once contaminants are removed from the surfaces, they cannot return unless the surfaces are contaminated anew from subsequent operations. After decontamination, there may be residual contamination present on or in the building materials, but the contaminant concentrations will be at or below the building cleanup levels (a level of no significant risk or background).

5.5.2.6 Benefits

Under this alternative, the site buildings can be reused for residential or commercial reuse, depending on the desired level of cleanup. Contaminants would be removed and there would be no residual wastes to manage. This alternative would not require relocation of people, businesses, or utilities.

5.5.2.7 Timeliness

The time required to complete this alternative will depend on the number of decontamination methods required to reach the cleanup goals and the number of personnel

available to perform the work. It is anticipated that the decontamination should be completed on all site buildings within 1 to 2 years after completion of pilot studies.

5.5.2.8 Nonpecuniary Interests

This alternative is not anticipated to have an impact on local aesthetics. All decontamination will take place indoors and not be visible to the general public. There could be increased truck traffic to and from the site, especially during waste removal. However, the truck traffic is not anticipated to have a negative impact on the community because of the industrial nature of the area. Specific truck routes will be established to minimize the impact on local traffic.

5.6 EVALUATION OF ALTERNATIVE B5: DECONTAMINATION/ DISMANTLING OF INDOOR AREAS

5.6.1 Description of Alternative B5

This alternative is similar to Alternative B4 in that contaminants are removed from the building surfaces and materials. In this alternative, however, instead of decontaminating all contaminated surfaces and materials, there is the option to dismantle certain building materials rather than decontaminate them.

The decontamination techniques for this alternative are identical to those in Alternative B4. These techniques are applicable to the same surfaces and areas as in Alternative B4. There are certain types of surfaces that may be more easily dismantled than decontaminated. These surfaces include floor tile, interior dry wall, wood paneling, and metal fume hoods. These surfaces can be substantially damaged by certain decontamination methods. Dismantling and removal of these materials will not affect the building's structural integrity, and these materials can be replaced if necessary.

Under this alternative, the following materials will be dismantled rather than decontaminated:

- Floor tiles containing PCBs.
- Floor tiles that cannot be decontaminated by dusting/vacuuming/wiping.
- Dry wall that cannot be decontaminated by dusting/vacuuming/wiping.
- Metal fume hoods that cannot be decontaminated by dusting/vacuuming/wiping.

These materials will be dismantled because it is easier and more economical to dismantle rather than to decontaminate them. This alternative gives the flexibility of choosing whether some of these materials will be cleaned or dismantled. For example, not all contaminated dry wall will have to be dismantled. Only the dry wall that cannot be easily decontaminated will be dismantled.

Any dismantled materials will be properly containerized and sampled for hazardous characteristics and TCLP. After characterization, the materials will be properly disposed off-site as a hazardous or nonhazardous waste.

After dismantling, the remaining contaminated areas will be decontaminated using the methods described in Alternative B4.

5.6.2 Assessment of Alternative B5

5.6.2.1 Effectiveness

This alternative represents a permanent solution as defined in the MCP. Although contaminants are not treated in the decontamination and dismantling processes, they are removed from the building surfaces or the surfaces are themselves removed. The methods could produce large quantities of waste materials which would be collected and disposed off-site in accordance with regulations. Decontamination methods will continue until the building surfaces have achieved the levels presented in Table 3-1. If feasible, remediation will continue until the surface contamination level is equivalent to background. Tables A-5, A-6, and A-15 contain information on background results and locations.

5.6.2.2 Short-Term and Long-Term Reliability

All waste generated during decontamination and dismantling will be containerized and stored in a manner that will meet RCRA requirements for hazardous waste storage. The wastes will be sampled and analyzed to determine if they are hazardous or not. If the wastes are hazardous, they will be disposed of off-site according to proper hazardous waste disposal procedures. If the wastes are nonhazardous, they will be properly disposed of off-site in a nonhazardous waste landfill.

Workers decontaminating the indoor areas at MTL will wear Level C protective equipment, if necessary, to protect themselves from the contaminated dusts and mists. In addition, workers doing steam cleanup will wear appropriate clothing for protection against steam burns. Workers performing scarification or grit blasting will wear hearing protection. All decontamination workers will be monitored for heat stress.

To protect the community and the environment from any dust or mist generated from decontamination or dismantling, plastic sheeting and other moisture barriers will be used to contain fugitive dusts and mists. Condensate from steam cleaning will be collected and containerized. All wastes generated from decontamination and dismantling will be properly disposed to minimize any potential adverse environmental impact.

The decontamination/dismantling alternative will provide adequate protection from the building contaminants. As contaminants are removed from the surfaces or the surfaces themselves are removed, the human potential for exposure through ingestion, inhalation, or absorption is reduced or eliminated. This alternative will prevent the spread of contaminants and is thus protective of the environment. The risk to human health and the environment is reduced by the decontamination/dismantling of the building surfaces. The alternative will be effective in eliminating contaminants since decontamination will continue using the methods necessary until the cleanup goals are achieved.

5.6.2.3 Implementability

Dismantling of materials such as dry wall, floor tile, wood paneling, or metal fume hoods is easily implemented. Fugitive dusts created from dismantling may spread contamination. This exposure pathway will be adequately monitored and controlled if necessary. Extra precaution and specific procedures may be required for the removal of asbestos-containing floor tiles. Removal of asbestos-containing floor tiles will be done in accordance with proper asbestos-containing building materials protocols.

The decontamination technologies of dusting/vacuuming/wiping, steam cleaning, solvent or water washing, and grit blasting are all easily implemented, as discussed in Subsection 5.5.2.3.

5.6.2.4 Cost

All equipment for this alternative will be purchased. Due to the relatively short duration for implementation, all costs have been shown as operating costs for the various decontamination and dismantling methods. These costs have been determined for each reuse scenario. Since it is unknown whether grit blasting will be required, each cost has been presented twice: once including costs for grit blasting and once without costs for grit blasting. The cost tables are presented in Tables 5-15 through 5-20. In the table for each decontamination and dismantling method, estimates of surface area to be remediated and the remediation rate have been provided. Only the areas requiring remediation were used for the cost estimate. Areas not sampled are not included in the cost estimate. It should be noted that although these costs include confirmation sampling of areas previously decontaminated for radiation, they do not include remediation of these surfaces. The estimated costs may increase up to 30% if such areas require chemical remediation.

No environmental restoration is required with this alternative and no damage to natural resources results from its implementation.

Table 5-15
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 1 - Commercial Reuse (Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	201,490 ft^2		
Labor (decontamination rate 75 ft^2/hr)	2,687 hrs	41 \hr	110,167
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	564 lbs	0.15 \lb	85
Personal Protective Equipment	336 days	60 \day	20,160
Subtotal (a)			134,912
b. Foaming Agent[2]	174,445 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	1,876 hrs	41 \hr	76,916
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	235 days	400 \day	94,000
Waste Generated (.14 gal/ft^2)	24,422 gal	2.50 \gal	61,055
Personal Protective Equipment	235 days	60 \day	14,100
Subtotal (b)			249,671
c. Gritblasting Walls and Floors[3]	201,490 ft^2		
Labor (decontamination rate - 16 ft^2/hr)	12,593 hrs	41 \hr	516,313
Equipment Cost - Purchase	2 ea	1,000 ea	2,000
Waste Generated (12 lb/ft^2)	1,209 tons	300 \ton	362,700
Personal Protective Equipment	1,574 days	60 \day	94,440
Subtotal (c)			975,453
d. Steam Cleaning[4]	7,725 ft^2		
Labor (decontamination rate 66 ft^2/hr)	117 hrs	41 \hr	4,797
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	4,635 gal	2 \gal	9,270
Personal Protective Equipment	15 days	60 \day	900
Subtotal (d)			16,967
3. Dismantling			
a. Remove Fume Hoods	20 hoods		
Labor (dismantling rate - 72 hrs. ea.)	1,440 hrs	41 \hr	59,040
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (100 lb. ea.)	1.00 ton	500 \ton	500
Personal Protective Equipment	180 days	60 \day	10,800
Subtotal (a)			71,540
b. Remove Drywall	15,620 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	223 hrs	41 \hr	9,143
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (5 lb/ft^2)	39 tons	500 \ton	19,500
Personal Protective Equipment	28 days	60 \day	1,680
Subtotal (b)			31,523
c. Remove Floor Tile	74,105 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	1,059 hrs	41 \hr	43,419
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (1 lb/ft^2)	37.0 tons	500 \ton	18,500
Personal Protective Equipment	132 days	60 \day	7,920
Subtotal (c)			71,039

Table 5-15
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 1 - Commercial Reuse (Including Costs for Grit Blasting) (continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
4. Utilities (reimbursement to Army)		lump sum	800,000
5. **Subtotal 1 (1, 2, 3 and 4)**			**2,651,105**
6. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			848,353
7. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			583,243
8. **Verification Sampling**			
Laboratory Analysis	2,000 samples	500 \sample	1,000,000
Labor (5 samples/hr)	400 hrs	65 \hr	26,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (8)			1,064,000
9. **Subtotal 2**			**5,146,701**
10. Administration and Profit (15%) of Subtotal 2)			772,005
11. **Subtotal 3**			**5,918,706**
12. Contingency (25% of Subtotal 3)			1,479,677
13. Government Construction Management (7.5 % of Subtotal 3)			443,903
14. **Total Cost (Rounded)**			**7,842,000**

[1] - Total area excluding floor tiles, dry wall, and areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Same as total number 1.

[4] - Total area containing explosives.

ls - lump sum

Table 5-16
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 1 - Commercial Reuse (Not Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	201,490 ft^2		
Labor (decontamination rate 75 ft^2/hr)	2,687 hrs	41 \hr	110,167
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	564 lbs	0.15 \lb	85
Personal Protective Equipment	336 days	60 \day	20,160
Subtotal (a)			134,912
b. Foaming Agent[2]	174,445 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	1,876 hrs	41 \hr	76,916
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	235 days	400 \day	94,000
Waste Generated (.14 gal/ft^2)	24,422 gal	2.50 \gal	61,055
Personal Protective Equipment	235 days	60 \day	14,100
Subtotal (b)			249,671
c. Steam Cleaning[4]	7,725 ft^2		
Labor (decontamination rate 66 ft^2/hr)	117 hrs	41 \hr	4,797
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	4,635 gal	2 \gal	9,270
Personal Protective Equipment	15 days	60 \day	900
Subtotal (d)			16,967
3. Dismantling			
a. Remove Fume Hoods	20 hoods		
Labor (dismantling rate - 72 hrs. ea.)	1,440 hrs	41 \hr	59,040
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (100 lb. ea.)	1.00 ton	500 \ton	500
Personal Protective Equipment	180 days	60 \day	10,800
Subtotal (a)			71,540
b. Remove Drywall	15,620 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	223 hrs	41 \hr	9,143
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (5 lb/ft^2)	39 tons	500 \ton	19,500
Personal Protective Equipment	28 days	60 \day	1,680
Subtotal (b)			31,523
c. Remove Floor Tile	74,105 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	1,059 hrs	41 \hr	43,419
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (1 lb/ft^2)	37.0 tons	500 \ton	18,500
Personal Protective Equipment	132 days	60 \day	7,920
Subtotal (c)			71,039
4. Utilities (reimbursement to Army)		lump sum	800,000
5. Subtotal 1 (1, 2, 3 and 4)			**1,675,652**
6. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			536,209

Table 5-16
Estimate of Operating Costs for Alternative B5 :
Decontamination/Dismantling of Indoor Areas for Reuse Scenario 1 - Commercial Reuse
(Not Including Costs for Grit Blasting)
(continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
7. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			368,643
8. **Verification Sampling**			
Laboratory Analysis	2,000 samples	500 \sample	1,000,000
Labor (5 samples/hr)	400 hrs	65 \hr	26,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (8)			1,064,000
9. **Subtotal 2**			**3,644,503**
10. Administration and Profit (15%) of Subtotal 2)			546,676
11. **Subtotal 3**			**4,191,179**
12. Contingency (25% of Subtotal 3)			1,047,795
13. Government Construction Management (7.5 % of Subtotal 3)			314,338
14. **Total Cost (Rounded)**			**5,553,000**

[1] - Total area excluding floor tiles, dry wall, and areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total area containing explosives.

ls - lump sum

Table 5-17
Estimate of Operating Costs for Alternative B5 :
Decontamination/Dismantling of Indoor Areas for Reuse Scenario 2 - Residential Reuse
(Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	225,850 ft^2		
Labor (decontamination rate 75 ft^2/hr)	3,011 hrs	41 \hr	123,451
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	632 lbs	0.15 \lb	95
Personal Protective Equipment	376 days	60 \day	22,560
Subtotal (a)			150,606
b. Foaming Agent[2]	192,225 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	2,067 hrs	41 \hr	84,747
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	258 days	400 \day	103,200
Waste Generated (.14 gal/ft^2)	26,912 gal	2.50 \gal	67,280
Personal Protective Equipment	258 days	60 \day	15,480
Subtotal (b)			274,307
c. Gritblasting Walls and Floors[3]	225,850 ft^2		
Labor (decontamination rate - 16 ft^2/hr)	14,116 hrs	41 \hr	578,756
Equipment Cost - Purchase	2 ea	1,000 ea	2,000
Waste Generated (12 lb/ft^2)	1,355 tons	300 \ton	406,500
Personal Protective Equipment	1,765 days	60 \day	105,900
Subtotal (c)			1,093,156
d. Steam Cleaning[4]	13,630 ft^2		
Labor (decontamination rate 66 ft^2/hr)	207 hrs	41 \hr	8,487
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	8,178 gal	2 \gal	16,356
Personal Protective Equipment	26 days	60 \day	1,560
Subtotal (d)			28,403
3. Dismantling			
a. Remove Fume Hoods	37 hoods		
Labor (dismantling rate - 72 hrs. ea.)	2,664 hrs	41 \hr	109,224
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (100 lb. ea.)	2.00 tons	500 \ton	1,000
Personal Protective Equipment	333 days	60 \day	19,980
Subtotal (a)			131,404
b. Remove Drywall	18,790 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	268 hrs	41 \hr	10,988
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (5 lb/ft^2)	47 tons	500 \ton	23,500
Personal Protective Equipment	34 days	60 \day	2,040
Subtotal (b)			37,728
c. Remove Floor Tile	78,700 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	1,124 hrs	41 \hr	46,084
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (1 lb/ft^2)	39.0 tons	500 \ton	19,500
Personal Protective Equipment	141 days	60 \day	8,460
Subtotal (c)			75,244

Table 5-17
Estimate of Operating Costs for Alternative B5 :
Decontamination/Dismantling of Indoor Areas for Reuse Scenario 2 - Residential Reuse
(Including Costs for Grit Blasting)
(continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
4. Utilities (reimbursement to Army)		lump sum	800,000
5. **Subtotal 1 (1, 2, 3 and 4)**			**2,890,848**
6. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			925,071
7. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			635,987
8. **Verification Sampling**			
Laboratory Analysis	3,000 samples	500 \sample	1,500,000
Labor (5 samples/hr)	600 hrs	65 \hr	39,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (8)			1,577,000
9. **Subtotal 2**			**6,028,906**
10. Administration and Profit (15%) of Subtotal 2)			904,336
11. **Subtotal 3**			**6,933,241**
12. Contingency (25% of Subtotal 3)			1,733,310
13. Government Construction Management (7.5 % of Subtotal 3)			519,993
14. **Total Cost (Rounded)**			**9,187,000**

[1] - Total area excluding floor tiles, dry wall, and areas containing explosives.
[2] - Total vacuumed area excluding areas containing PCBs.
[3] - Same as total number 1.
[4] - Total area containing explosives.
ls - lump sum

Table 5-18
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 2 - Residential Reuse (Not Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	225,850 ft^2		
Labor (decontamination rate 75 ft^2/hr)	3,011 hrs	41 \hr	123,451
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	632 lbs	0.15 \lb	95
Personal Protective Equipment	376 days	60 \day	22,560
Subtotal (a)			150,606
b. Foaming Agent[2]	192,225 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	2,067 hrs	41 \hr	84,747
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	258 days	400 \day	103,200
Waste Generated (.14 gal/ft^2)	26,912 gal	2.50 \gal	67,280
Personal Protective Equipment	258 days	60 \day	15,480
Subtotal (b)			274,307
c. Steam Cleaning[4]	13,630 ft^2		
Labor (decontamination rate 66 ft^2/hr)	207 hrs	41 \hr	8,487
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	8,178 gal	2 \gal	16,356
Personal Protective Equipment	26 days	60 \day	1,560
Subtotal (d)			28,403
3. Dismantling			
a. Remove Fume Hoods	37 hoods		
Labor (dismantling rate - 72 hrs. ea.)	2,664 hrs	41 \hr	109,224
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (100 lb. ea.)	2.00 tons	500 \ton	1,000
Personal Protective Equipment	333 days	60 \day	19,980
Subtotal (a)			131,404
b. Remove Drywall	18,790 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	251 hrs	41 \hr	10,291
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (5 lb/ft^2)	47 tons	500 \ton	23,500
Personal Protective Equipment	31 days	60 \day	1,860
Subtotal (b)			36,851
c. Remove Floor Tile	78,700 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	1,124 hrs	41 \hr	46,084
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (1 lb/ft^2)	39.0 tons	500 \ton	19,500
Personal Protective Equipment	141 days	60 \day	8,460
Subtotal (c)			75,244
4. Utilities (reimbursement to Army)		lump sum	800,000
5. Subtotal 1 (1, 2, 3 and 4)			**1,796,815**
6. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			574,981

Table 5-18
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 2 - Residential Reuse (Not Including Costs for Grit Blasting) (continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
7. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			395,299
8. **Verification Sampling**			
Laboratory Analysis	3,000 samples	500 \sample	1,500,000
Labor (5 samples/hr)	600 hrs	65 \hr	39,000
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (8)			1,577,000
9. **Subtotal 2**			**4,344,095**
10. Administration and Profit (15%) of Subtotal 2)			651,614
11. **Subtotal 3**			**4,995,709**
12. Contingency (25% of Subtotal 3)			1,248,927
13. Government Construction Management (7.5 % of Subtotal 3)			374,678
14. **Total Cost (Rounded)**			**6,619,000**

[1] - Total area excluding floor tiles, dry wall, and areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Total area containing explosives.

ls - lump sum

Table 5-19
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 3 Mixed Commercial/Residential Use (Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	210,270 ft^2		
Labor (decontamination rate 75 ft^2/hr)	2,804 hrs	41 \hr	114,964
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	589 lbs	0.15 \lb	88
Personal Protective Equipment	351 days	60 \day	21,060
Subtotal (a)			140,612
b. Foaming Agent[2]	183,225 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	1,970 hrs	41 \hr	80,770
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	246 days	400 \day	98,400
Waste Generated (.14 gal/ft^2)	25,652 gal	2.50 \gal	64,130
Personal Protective Equipment	246 days	60 \day	14,760
Subtotal (b)			261,660
c. Gritblasting Walls and Floors[3]	210,270 ft^2		
Labor (decontamination rate - 16 ft^2/hr)	13,142 hrs	41 \hr	538,822
Equipment Cost - Purchase	2 ea	1,000 ea	2,000
Waste Generated (12 lb/ft^2)	1,262 tons	300 \ton	378,600
Personal Protective Equipment	1,643 days	60 \day	98,580
Subtotal (c)			1,018,002
d. Steam Cleaning[4]	9,225 ft^2		
Labor (decontamination rate 66 ft^2/hr)	140 hrs	41 \hr	5,740
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	5,535 gal	2 \gal	11,070
Personal Protective Equipment	18 days	60 \day	1,080
Subtotal (d)			19,890
3. Dismantling			
a. Remove Fume Hoods	22 hoods		
Labor (dismantling rate - 72 hrs. ea.)	1,584 hrs	41 \hr	64,944
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (100 lb. ea.)	1.00 tons	500 \ton	500
Personal Protective Equipment	198 days	60 \day	11,880
Subtotal (a)			78,524
b. Remove Drywall	15,620 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	223 hrs	41 \hr	9,143
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (5 lb/ft^2)	39.0 tons	500 \ton	19,500
Personal Protective Equipment	28 days	60 \day	1,680
Subtotal (b)			31,523

Table 5-19
Estimate of Operating Costs for Alternative B5 : Decontamination/Dismantling of Indoor Areas for Reuse Scenario 3 Mixed Commercial/Residential Use (Including Costs for Grit Blasting) (continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
c. Remove Floor Tile	74,105 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	1,059 hrs	41 \hr	43,419
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (1 lb/ft^2)	37.0 tons	500 \ton	18,500
Personal Protective Equipment	132 days	60 \day	7,920
Subtotal (c)			71,039
4. Utilities (reimbursement to Army)		lump sum	800,000
5. Subtotal 1 (1, 2, 3 and 4)			**2,721,250**
6. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			870,800
7. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			598,675
8. Verification Sampling			
Laboratory Analysis	2,400 samples	500 \sample	1,200,000
Labor (5 samples/hr)	480 hrs	65 \hr	31,200
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (8)			1,269,200
9. Subtotal 2			**5,459,926**
10. Administration and Profit (15%) of Subtotal 2)			818,989
11. Subtotal 3			**6,278,914**
12. Contingency (25% of Subtotal 3)			1,569,729
13. Government Construction Management (7.5 % of Subtotal 3)			470,919
14. Total Cost (Rounded)			**8,320,000**

[1] - Total area excluding floor tiles, dry wall, and areas containing explosives.

[2] - Total vacuumed area excluding areas containing PCBs.

[3] - Same as total number 1.

[4] - Total area containing explosives.

ls - lump sum

Table 5-20
Estimate of Operating Costs for Alternative B5 :
Decontamination/Dismantling of Indoor Areas for Reuse Scenario 3
Mixed Commercial/Residential Use
(Not Including Costs for Grit Blasting)

Description	Quantity	Unit Cost ($)	Total Cost ($)
1. Pilot Study			300,000
2. Decontamination			
a. ULPA Vacuum[1]	210,270 ft^2		
Labor (decontamination rate 75 ft^2/hr)	2,804 hrs	41 \hr	114,964
Equipment Cost - Purchase	3 ea	1,500 ea	4,500
Waste Generated (.0028 lb/ft^2)	589 lbs	0.15 \lb	88
Personal Protective Equipment	351 days	60 \day	21,060
Subtotal (a)			140,612
b. Foaming Agent[2]	183,225 ft^2		
Labor (decontamination rate - 93 ft^2/hr)	1,970 hrs	41 \hr	80,770
Equipment Cost - Cleaner	1 ea	3,600 ea	3,600
Materials	246 days	400 \day	98,400
Waste Generated (.14 gal/ft^2)	25,652 gal	2.50 \gal	64,130
Personal Protective Equipment	246 days	60 \day	14,760
Subtotal (b)			261,660
c. Steam Cleaning[4]	9,225 ft^2		
Labor (decontamination rate 66 ft^2/hr)	140 hrs	41 \hr	5,740
Equipment Cost - Purchase	1 ea	2,000 ea	2,000
Waste Generated (.6 gal/ft^2)	5,535 gal	2 \gal	11,070
Personal Protective Equipment	18 days	60 \day	1,080
Subtotal (d)			19,890
3. Dismantling			
a. Remove Fume Hoods	22 hoods		
Labor (dismantling rate - 72 hrs. ea.)	1,584 hrs	41 \hr	64,944
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (100 lb. ea.)	1.00 tons	500 \ton	500
Personal Protective Equipment	198 days	60 \day	11,880
Subtotal (a)			78,524
b. Remove Drywall	15,620 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	223 hrs	41 \hr	9,143
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (5 lb/ft^2)	39.0 tons	500 \ton	19,500
Personal Protective Equipment	28 days	60 \day	1,680
Subtotal (b)			31,523
c. Remove Floor Tile	74,105 ft^2		
Labor (dismantling rate - 70 ft^2/hr)	1,059 hrs	41 \hr	43,419
Miscellaneous Equipment Cost		lump sum	1,200
Waste Generated (1 lb/ft^2)	37.0 tons	500 \ton	18,500
Personal Protective Equipment	132 days	60 \day	7,920
Subtotal (c)			71,039
4. Utilities (reimbursement to Army)		lump sum	800,000
5. Subtotal 1 (1, 2, 3 and 4)			**1,703,248**

Table 5-20
Estimate of Operating Costs for Alternative B5 :
Decontamination/Dismantling of Indoor Areas for Reuse Scenario 3
Mixed Commercial/Residential Use
(Not Including Costs for Grit Blasting)
(continued)

Description	Quantity	Unit Cost ($)	Total Cost ($)
6. Mobilization/Demobilization, Construction Management, Site Services, and Health and Safety Oversight (32% of Subtotal 1)			545,039
7. Technology Implementation: Design, Plans, Specs, Regulatory Approval, Insurance, Bond and Permits (22% of Subtotal 1)			374,715
8. **Verification Sampling**			
Laboratory Analysis	2,400 samples	500 \sample	1,200,000
Labor (5 samples/hr)	480 hrs	65 \hr	31,200
Equipment cost	15,000 ls	1 \ls	15,000
Report Preparation	23,000 ls	1 \ls	23,000
Subtotal (8)			1,269,200
9. **Subtotal 2**			**3,892,202**
10. Administration and Profit (15%) of Subtotal 2)			583,830
11. **Subtotal 3**			**4,476,033**
12. Contingency (25% of Subtotal 3)			1,119,008
13. Government Construction Management (7.5 % of Subtotal 3)			335,702
14. **Total Cost (Rounded)**			**5,931,000**

1 - Total area excluding floor tiles, dry wall, and areas containing explosives.
2 - Total vacuumed area excluding areas containing PCBs.
3 - Total area containing explosives.
ls - lump sum

5.6.2.5 Risk

The short-term risks apply only to site workers. Decontamination workers will were Level C protective equipment, if necessary, to protect themselves from generated dusts or mists.

The decontamination and dismantling alternative will provide adequate protection from the building contaminants. As contaminants are removed from the surfaces or the surfaces are removed, the human potential for exposure through ingestion, inhalation, or absorption is reduced or eliminated.

The decontamination and dismantling alternative will prevent the spreading of contaminants and is thus protective of the environment. The risk to human health and the environment is reduced by the decontamination and dismantling of the building surfaces. The decontamination and dismantling alternative will significantly reduce the toxicity, mobility, and volume of contaminants within the buildings and indoor areas. This alternative, however, may not reduce the toxicity of the removed contaminants. In this case, the contaminants are not destroyed, but are removed, from the building materials or are retained on materials that are removed from the buildings. This alternative will create the following types of waste:

- Used cloths and wiping materials.
- Contaminated dust and debris.
- Used ULPA filters.
- Removed building materials (e.g., floor tiles, dry wall, etc.).
- Water from steam cleaning or water washing.
- Used abrasive material and grit blasting wash water (assuming grit blasting is needed).

These waste items will all be properly disposed of, but may remain toxic. Their mobility will be reduced when they are properly disposed of.

This alternative is irreversible because once contaminants are removed from the surfaces or the surfaces are removed, contaminants cannot return unless the surfaces are contaminated anew from subsequent operations. After decontamination and dismantling, there may be residual contamination present on or in the building materials, but the contaminant concentrations will be at or below a level of no significant risk or background.

5.6.2.6 Benefits

Under this alternative, the site buildings can be reused for residential or commercial reuse, depending on the desired level of cleanup. Contaminants would be removed and there would be no residual wastes to manage. This alternative would not require relocation of people, businesses, or utilities.

5.6.2.7 Timeliness

The time required to complete this alternative will depend on the number of decontamination methods required to reach the cleanup goals and the number of personnel available to perform the work. It is anticipated that the decontamination and dismantling should be completed on all site buildings within 1 to 2 years after completion of pilot studies.

5.6.2.8 Nonpecuniary Interests

This alternative is not anticipated to have an impact on local aesthetics. All decontamination and dismantling activities would take place indoors and not be visible to the general public. There could be increased truck traffic to and from the site, especially during waste removal. The truck traffic, however, is not anticipated to have a negative impact to the community due to the industrial nature of the area. Specific truck routes will be established to minimize the impact on local traffic.

SECTION 6

SUMMARY AND COMPARISON OF ALTERNATIVES

The MTL Indoor Area RAP has been performed in accordance with current MCP guidance and procedures. In this section, a comparison of the alternatives evaluated in Section 5 is presented with respect to noncost and cost elements.

6.1 NONCOST COMPARISON OF ALTERNATIVES

The remedial action alternatives were comparatively evaluated based on the following noncost criteria:

- Effectiveness
- Reliability
- Implementability
- Risk
- Benefits
- Timeliness
- Nonpecuniary interests

A summary of the comparison of the building alternatives is presented in Table 6-1.

6.2 COST COMPARISON OF ALTERNATIVES

A present-worth cost analysis was performed for each remedial action alternative based on the capital and O&M cost estimates previously presented in Section 5. For this analysis, a 30-year lifetime for Alternatives B1 and B2 were used; Alternatives B4 and B5 were given a lifetime of one year. The difference in cost for the three site cleanup scenarios is presented for Alternatives B4 and B5. A cost summary comparison for the alternatives, including present-worth costs, is also presented in Table 6-2. The net present worth was based upon a real interest rate (prime interest rate minus inflation rate) of 3%.

Table 6-1

Noncost Comparison of Building Alternatives

Criteria	Alternative B1 No Action	Alternative B2 Institutional Actions	Alternative B4 Decontamination of Indoor Areas	Alternative B5 Decontamination/ Dismantling of Indoor Areas
Effectiveness				
Achieving a Permanent or Temporary Solution	Does not achieve a permanent or temporary solution.	Achieves a permanent solution but requires continual enforcement of activity and use limitations.	Achieves a permanent solution.	Achieves a permanent solution.
Reusing, Recycling, Destroying, Detoxifying, or Treating Hazardous Material	None. Contaminants remain in place.	None. Contaminants remain in place.	Various decontamination methods are used to remove contaminants from surfaces and subsurfaces. Contaminants are not destroyed or detoxified.	Various decontamination methods are used to remove contaminants from surfaces and subsurfaces. Contaminants are not destroyed or detoxified.
Reducing Levels of Contaminants that Achieve or Approach Background	Does not reduce levels of contaminants except through natural degradation and attenuation.	Does not reduce levels of contaminants except through natural degradation and attenuation.	Would reduce levels of on-site contaminants to no significant risk level or to background.	Would reduce levels of on-site contaminants to no significant risk level or to background.
Short-Term and Long-Term Reliability				
Degree of Uncertainty of Alternative Success	High degree of uncertainty.	Success rate would depend on efficiency of implementation of activity and use limitations.	High degree of success expected since decontamination will continue until cleanup goals are reached.	High degree of success expected since decontamination will continue until cleanup goals are reached.
Management of Residues or Remaining Wastes	No management although contaminants remain on surfaces.	Long-term maintenance of buildings required.	No management required for remaining contaminants, although alternative may generate large quantities of waste requiring off-site disposal.	No management required for remaining contaminants, although alternative may generate large quantities of waste requiring off-site disposal.

Table 6-1

Noncost Comparison of Building Alternatives
(Continued)

Criteria	Alternative B1 No Action	Alternative B2 Institutional Actions	Alternative B4 Decontamination of Indoor Areas	Alternative B5 Decontamination/ Dismantling of Indoor Areas
Implementability				
Technical Complexity	No technical complexity.	No technical complexity.	While individual decontamination methods are not complex, the implementation of multiple methods over many buildings may be very complex.	While individual decontamination methods are not complex, the implementation of multiple methods over many buildings may be very complex.
Integration with Existing Operations	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Monitoring, O&M, or Access Requirements	None.	Activity and use limitations will be required along with continual monitoring of their effectiveness.	Continual workplace monitoring will be required during implementation. Access to be restricted to workers only.	Continual workplace monitoring will be required during implementation. Access to be restricted to workers only.
Availability of Services, Equipment, or Specialists	None needed.	None needed.	Readily available.	Readily available.
Availability of Off-Site TSD Facility	Not applicable.	Not applicable.	Readily available.	Readily available.
Meets Regulatory Requirements for Permits, Approvals, or Licenses	Alternative not likely to be approved by Massachusetts DEP.	Activity and Use limitations would require Massachusetts DEP approval.	Meets regulatory requirements. No permits or approvals necessary.	Meets regulatory requirements. No permits or approvals necessary.

Table 6-1

Noncost Comparison of Building Alternatives (Continued)

Criteria	Alternative B1 No Action	Alternative B2 Institutional Actions	Alternative B4 Decontamination of Indoor Areas	Alternative B5 Decontamination/ Dismantling of Indoor Areas
Risk				
On-Site and Off-Site Due to Implementation	No additional risk from implementation, but existing risk remains.	No additional risk from implementation. Existing risk reduced as long as controls are maintained.	Workers will be adequately protected to prevent exposure to contaminants. Possibility of low-level contaminant release to outside areas. Minimal off-site risk from waste transportation.	Workers will be adequately protected to prevent exposure to contaminants. Possibility of low-level contaminant release to outside areas. Minimal off-site risk from waste transportation.
On-Site and Off-Site Due to Operation	Not applicable.	Not applicable.	Operation is synonymous with implementation for this alternative.	Operation is synonymous with implementation for this alternative.
Risk to Human Health and the Environment after Completion of Actions	No reduction in site risk except through natural attenuation and degradation. Risk to remain for the long-term.	No reduction in site risk except through institutional controls to limit direct contact with contaminants.	Remaining site risk at the no significant risk level or from background levels of contaminants.	Remaining site risk at the no significant risk level or from background levels of contaminants.
Benefits				
Restoring Natural Resources	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Site Productive Reuse	No residential or commercial reuse possible except in uncontaminated buildings.	No residential or commercial reuse possible except in uncontaminated buildings.	Can be reused for residential or commercial purposes depending on the desired level of cleanup.	Can be reused for residential or commercial purposes depending on the desired level of cleanup.
Avoided Cost of Relocation of People, Businesses, or Utilities	None.	None.	None.	None.
Avoided Lost Value of Site	None.	None.	Reuse potential results in an increase in site value.	Reuse potential results in an increase in site value.

Table 6-1

Noncost Comparison of Building Alternatives (Continued)

Criteria	Alternative B1 No Action	Alternative B2 Institutional Actions	Alternative B4 Decontamination of Indoor Areas	Alternative B5 Decontamination/ Dismantling of Indoor Areas
Timeliness				
Time Required to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	Indeterminate.	Indeterminate.	1 to 2 years required for decontamination (after pilot studies).	1 to 2 years required for decontamination and dismantling (after pilot studies).
Nonpecuniary Interests				
Aesthetic Values	No impact on site aesthetics.	Minimal impact on site aesthetics.	Minimal impact on aesthetics during implementation. Off-site waste transport not expected to have impact.	Minimal impact on aesthetics during implementation. Off-site waste transport not expected to have impact.

Table 6-2

Cost Comparison Summary of Remedial Action Alternatives

Alternative	Capital Cost ($)	O&M ($) (Year 1)	O&M ($/Year) (Years 2-30)	Net Present Worth (30 Years, 3% Interest) ($)
B1. No Action	0	6,100	6,100	119,600
B2. Institutional Actions	257,500	553,000	553,000	11,100,000
B4. Decontamination of Indoor Areas				
Reuse Scenario 1	0	w/grit blasting 7,861,000 w/o grit blasting 5,572,000	0	w/grit blasting 7,861,000 w/o grit blasting 5,572,000
Reuse Scenario 2	0	w/grit blasting 9,080,000 w/o grit blasting 6,515,000	0	w/grit blasting 9,080,000 w/o grit blasting 6,515,000
Reuse Scenario 3	0	w/grit blasting 8,323,000 w/o grit blasting 5,935,000	0	w/grit blasting 8,323,000 w/o grit blasting 5,935,000

Table 6-2

Cost Comparison Summary of Remedial Action Alternatives (Continued)

Alternative	Capital Cost ($)	O&M ($) (Year 1)	O&M ($/Year) (Years 2-30)	Net Present Worth (30 Years, 3% Interest) ($)
B5. Decontamination/Dismantling of Indoors Areas				
Reuse Scenario 1	0	w/grit blasting 7,842,000 w/o grit blasting 5,553,000	0	w/grit blasting 7,842,000 w/o grit blasting 5,553,000
Reuse Scenario 2	0	w/grit blasting 9,187,000 w/o grit blasting 6,619,000	0	w/grit blasting 9,187,000 w/o grit blasting 6,619,000
Reuse Scenario 3	0	w/grit blasting 8,320,000 w/o grit blasting 5,931,000	0	w/grit blasting 8,320,000 w/o grit blasting 5,931,000

It must be noted that these costs represent only the remedial actions that could be undertaken. They do not take into account the value of the MTL property or the potential increase in value as a result of site remediation.

6.3 COMPARATIVE ANALYSIS OF ALTERNATIVES

The following subsections provide a comparative analysis for the alternatives using each of the analysis criteria for evaluation. The following augments the information presented in Table 6-1 and highlights the advantages, disadvantages, and relative merits of each alternative.

6.3.1 Effectiveness

Alternatives B1 and B2 do not achieve contaminant reduction of any kind except that through natural attenuation or degradation. Contaminants remain in place. Alternatives B4 and B5 would remove contaminants from the building surfaces through various surface decontamination methods or the surfaces could be removed under Alternative B5. Neither alternative results in recycling, destroying, or detoxifying the contaminants; however, remaining levels of contaminants would be at a level consistent with background or to a level of no significant risk.

Alternative B1 would not achieve a permanent or temporary solution. Alternative B2 would be a permanent solution since risk is reduced by reducing the exposure to contaminated areas. Alternatives B4 and B5 achieve permanent solutions since contaminants are removed and remaining contaminants are either at background or at a level of no significant risk.

6.3.2 Short-Term and Long-Term Reliability

Alternatives B1 and B2 have a high degree of uncertainty because contaminants remain in place. Alternative B1 is not expected to succeed since no risk reduction measures are taken. Activity and use limitations under Alternative B2 would result in risk reduction, but the

effectiveness of these limitations is uncertain. Continued maintenance would be required to ensure the controls were being properly observed. Alternatives B4 and B5 are expected to have a high degree of success because both are designed to continue to be implemented until confirmational sampling on building surfaces demonstrates that cleanup goals have been achieved. This may require multiple applications of a particular technology or multiple technologies for a given area.

Alternatives B1, B4, and B5 do not require management of residues or remaining wastes. Alternative B1 has no management actions although contaminants remain in place. Alternatives B4 and B5 have no management actions since all wastes generated would be disposed of off-site at the completion of interior actions. Alternative B2 does require long-term maintenance to verify continual conformance with the building activity and use limitations.

6.3.3 Implementability

Alternatives B1 and B2 are not technically complex. Alternative B2 may be administratively complex in establishing and implementing the building activity and use limitations. Alternatives B4 and B5 may become complex to implement because of the large scale of surfaces requiring remediation. While no individual remediation method is complicated, many areas may require more than one method to achieve cleanup goals. Also the remediation methods are very labor intensive and would require many people on the site. Coordinating various activities and maintaining the proper level of health and safety monitoring may become complex.

Alternative B1 involves no monitoring, O&M, or access requirements. Alternative B2 involves long-term maintenance to ensure compliance with building activity and use limitations. Alternatives B4 and B5 would involve continual workplace monitoring for health and safety concerns. Access to buildings would be restricted to workers during remediation. After implementation is complete, neither Alternative B4 nor B5 has any maintenance activities required.

Alternatives B1 and B2 do not require special services or equipment and no off-site treatment, storage, or disposal is needed. For Alternatives B4 and B5, all needed services and equipment are readily available. An off-site disposal facility is also readily available.

None of these alternatives involve techniques that require individual permits. Massachusetts DEP would need to approve the activity and use limitations under Alternative B2.

6.3.4 Risk

Alternative B1 has no reduction in site risk as no actions are taken to remove contaminants or prevent exposure to the contaminants. There is no additional risk from implementing this alternative but the existing risk remains.

Alternative B2 has a reduction in site risk only by building activity and use limitations. Since the contaminants remain in place, this risk reduction is only as effective as the continued application and maintenance of the activity and use limitations. There is no additional risk from implementing this alternative.

Both Alternatives B4 and B5 have a similar impact on site risk. During implementation, contaminants can be resuspended in the air from decontamination and removal activities. To compensate for this, all workers will be adequately protected in respiratory and clothing protection as needed to prevent exposure to the contaminants. There is the possibility of a low-level contaminant release to the outside because of the contaminant mobilization. Barriers will be established in work areas to prevent the spreading of contaminated dusts or mists. There is also the possibility of a contaminant release during off-site waste transportation via traffic accident. This possibility is considered minimal. Once the implementation of either alternative is completed, the remaining site risk is either at the no significant level or at background levels depending on the desired cleanup standards for reuse (commercial or residential).

6.3.5 Benefits

None of these alternatives would involve the need to restore natural resources. No reuse of contaminated areas would be possible under Alternatives B1 or B2 because the contaminants would remain in place. Under Alternatives B4 and B5, the buildings could be reused for residential or commercial reuse, depending on the level of desired remediation to be performed. None of these alternatives involve the relocation of people, businesses, or utilities. The site value would not increase under Alternatives B1 or B2, but would increase under Alternatives B4 or B5 because of the reuse potential of the buildings.

6.3.6 Timeliness

The time it would take to reach the no significant risk level for Alternatives B1 or B2 is indeterminate since contaminants remain in place and the only reduction in contaminant level would be through natural attenuation and degradation. For Alternatives B4 and B5, it is estimated that once pilot studies were completed, it would take 1 to 2 years to complete the remediation of building surfaces and achieve the no significant risk level.

6.3.7 Nonpecuniary Interests

Alternative B1 would have no impact on site aesthetics. Alternative B2 would have minimal impact from the installation of signs and fences. The remedial actions of Alternatives B4 and B5 are not expected to have significant impact on aesthetics. The majority of work will take place indoors and will not be visible to the public. There will be an increase in truck traffic to and from the site, especially during waste transport, but this is not deemed to be significant because of the industrial nature of the area.

6.4 SELECTION OF REMEDIAL ACTION ALTERNATIVE

The U.S. Army has selected alternative B5 (Decontamination/Dismantling of Indoor Areas) as the alternative for implementation at the site. This alternative is a permanent solution

and will reduce contaminant levels to a no significant risk level. The alternative also will reduce contaminant levels that will achieve or approach background. This alternative results in the remediation of each surface above cleanup standards. These surfaces are either decontaminated until cleanup levels are achieved or the surfaces (such as floor tile, dry wall, and fume hoods) are removed if they cannot be decontaminated without resulting in surface destruction.

This alternative is considered superior to the other alternatives considered. Alternatives B1 and B2 do not result in surface remediation. Alternative B1 has no risk reduction measures, and Alternative B2 requires long-term maintenance to ensure risk reduction by preventing use of contaminated buildings. Alternative B4 would also be a permanent solution, but was not selected since it does not allow for the flexibility of Alternative B5 for remediation of surfaces such as floor tile, dry wall, and other such surfaces. In some cases, it would be impossible to decontaminate the surface without destroying it. Alternative B5 allows for the on-site decision whether to decontaminate or remove such surfaces based on the site specifics.

Alternative B5 will achieve a level of no significant risk for building surfaces. The no significant risk level was established through risk assessment and background determinations. Surface cleanup standards are based on risk-based levels and background concentrations. For each contaminant of concern, the cleanup goal was the higher of the background or risk-based number. These cleanup goals were presented in Table 3-1. During remediation, these cleanup goals will be met. After the completion of a remedial step (such as dusting, vacuuming, and wiping), samples will be collected from the cleaned surfaces and analyzed for the contaminants of concern. If the step has failed to achieve the cleanup goals, the step will either be repeated or an additional step (such as washing or scarification) will be implemented. After each subsequent step, samples will again be collected from the surface and analyzed for the contaminants of concern. Remedial actions will continue until the surface cleanup standards are met. For surfaces that are dismantled and removed (such as floor tile and dry wall) the surface underneath the removed surface will be sampled and analyzed to ensure that contaminants are not present above the no significant risk level.

As part of implementing Alternative B5, the recommended scenario from the Reuse Plan will be adopted. This scenario is mixed reuse or scenario number 3. This establishes which surfaces will be remediated and the minimum level of cleanup required.

This alternative is not designed to result in all remedial actions achieving background conditions for all contaminants. However, background may be achieved during remediation. As shown in Table A-1, for the 49 contaminants of concern, the commercial reuse results in 3 contaminants having background concentrations as the cleanup goals; the residential reuse results in 2 contaminants with background levels as cleanup goals. Also, the remediation methods are not contaminant-concentration specific. Each method used will remove contaminants to the maximum extent feasible. If any contaminants remain, it would be because the action was technically unable to remove them. It is also important to recognize that remedial actions may surpass the no significant risk levels and achieve background. This would be confirmed only during the confirmatory sampling at the completion of the action.

This alternative does specify that if a remedial action achieves the cleanup goals (the no significant risk level) but concentrations remain above background, that further action will be taken only if no significant expense is incurred. While it is unknown if this condition will ever occur during remediation, this decision was made for two reasons. The first reason is that the difference in cleanup level between no significant risk and background is a small one. As stated above, several compounds of concern already have cleanup limits that are background levels. For those compounds whose cleanup limit is risk-based, in most cases the background level is less than an order of magnitude lower than the risk-based goal. Hence, additional degree of risk reduction is small. The second reason is that achievement of this additional risk protection would likely result in a substantial and disproportionate increase in remedial cost. It is projected that remedial objectives at most surfaces will be achieved after the completion of one or two decontamination methods. For most surfaces, these methods are dusting/vacuuming/wiping, and washing. To achieve the background concentrations for all contaminants of concern, aggressive cleaning or removal of material

would likely be required. Any significant increase in remedial costs would be evaluated based on any additional benefit which would be obtained.

Therefore, Alternative B5 is chosen for implementation at the site. It is a permanent solution and will achieve a no significant risk level. The alternative will also reduce contaminant levels to those that achieve or approach background to the extent feasible. However, because of technical feasibility limitations, this alternative may not achieve background concentrations for all contaminants. If the alternative achieves the no significant risk level but has not achieved background for all contaminants, no further actions, which involve a significant expense, will be taken because of the substantial and disproportionate increases in remedial costs required to achieve background.

It should be noted that demolition of Building 39 is being considered because it does not fit into future reuse plans for the property. Although the demolition option was not considered for a detailed analysis based on the reasons cited in Section 4, factors other than the screening criteria used in Section 4 may result in some buildings being demolished. A decision about demolishing buildings will be made at a later date. If a building is demolished, partial cleaning of the building may be necessary so that the debris waste will not need to be classified as a hazardous waste.

6.5 PLAN FOR REMEDIATION

This subsection presents a proposed plan and sequence for remediation of building interiors at MTL for the selected alternative (Alternative B5). This plan will be expanded upon in a Remedy Implementation Plan (RIP) in accordance with 310 CMR 40.00870.

6.5.1 Pre-Remediation Testing

The following activities are part of pre-remediation testing:

1. Conduct sampling and analysis to confirm areas to be remediated before remediation activities start. This program will consist of the following activities:

- Confirmatory sampling in previously remediated areas (Category 3 radiological cleaning areas).
- Sampling to determine valence state of chromium.
- Resampling in areas with inconclusive analytical results.
- Areas not previously sampled.

Each of these activities is expanded upon in the following paragraphs.

As discussed in Subsection 1.2.3.2, some areas of the facility were cleaned or otherwise remediated during the radiological decommissioning. It is presumed that these areas will not require further remediation. However, confirmatory sampling will be conducted in those areas where chemical contaminants exceed cleanup limits. This will ensure cleanup limits are being met. The confirmatory sampling in these areas will consist of repeating those wipe samples that exceeded cleanup limits in rooms that were subsequently cleaned during radiological decommissioning. The wipe samples will be analyzed for those contaminants that were previously identified as exceeding the cleanup limits. These areas are listed in Table 6-3.

Many areas were designated as requiring remediation because the concentration of chromium exceeded cleanup limits. In many of these areas chromium was the only compound that exceeded cleanup limits. However, the cleanup limit for chromium was calculated assuming that it existed as chromium(VI), the valence state that exhibits the highest risk. Since chromium does not typically exist as chromium(VI), resampling these areas to determine the valence state of chromium may reduce the areas that require remediation. A subset of these areas will be resampled in order to perform a statistical comparison of chromium VI to total chromium. These areas are listed in Table 6-4.

In some cases, concentrations of chemicals could only be determined to be "greater than" a value because of interference from other compounds. These compounds were assumed to exceed cleanup limits even if the "greater than" value was less than the cleanup limit. Those areas where "greater than" detections are the only compounds that exceed cleanup limits shall be resampled and reanalyzed in order to confirm the concentration. Again, a subset of these areas will be resampled in order to perform a statistical comparison. These areas are presented in Table 6-5.

Table 6-3
Rooms Remediated for Radiological Contamination and Identified with Chemical Contamination

Commercial		
Building	Room	Type
39	108	Floor
39	142	Floor
39	145	Floor
39	247	Floor
39	248	Floor
39	501	Wall
39	503	Floor
39	512	Floor/Wall
39	512	Fume Hood
39	513	Wall
39	514	Floor/Wall
39	514	Fume Hood
39	101A	Floor
39	155B	Floor/Wall
43	Central	Floor/Wall
43	Central	I-Beam
43	Mach. Area	Floor/Wall
43	Scale Rm.	Floor
43	Sto. Rm.	Floor/Wall
43	DU Cage	Floor/Wall
311	10	Floor/Wall
311	11	Floor/Wall
311	12	Floor/Wall
311	14	Floor/Wall
311	19	Floor/Wall
311	32	Floor
311	Mezzanine	Floor
312	3	Floor
312	3.1	Floor
312	3.2	Floor/Wall
312	101	Exhaust Vent
312	101	Floor
312	101	Fume Hood
312	102	Floor/Wall
312	103	Floor

Commercial		
Building	Room	Type
312	105	Floor
312	110	Floor
312	111	Exhaust Vent
312	111	Floor/Wall
312	113	Floor
312	114	Exhaust Vent
312	114	Floor/Wall
312	114	Floor Drain
312	115	Floor
312	115	Floor Drain
312	117	Exhaust Vent
312	117	Floor/Wall
312	117	Floor Drain
312	118	Exhaust Vent
312	118	Floor
312	120	Floor/Wall
312	120	Fume Hood
312	121	Floor
312	124	Floor
312	125	Floor
312	126	Floor
312	126	Floor Drain
312	135	Floor/Wall
312	137	Fume Hood

Residential		
Building	Room	Type
39	145	Fume Hood
39	247	Wall
39	513	Floor
312	115	Wall
312	121	Wall
312	137	Floor/Wall

Table 6-4
Areas Containing Only Chromium Contamination

Commercial		
Building	Room	Location
37	127	Floor
39	140	Floor
39	140	Fume Hood
39	153	Wall
39	207	Floor
39	331	Floor
39	331	Fume Hood
39	509	Floor
39	514	Fume Hood
39	538	Wall
43	Scale Rm.	Floor
97	143	Fume Hood
292	120	Fume Hood
292	128	Fume Hood
292	228	Exhaust Vent
311	34	Floor
311	102	Fume Hood
313	1.5	Wall
313	125	Fume Hood
313	138	Wall
313	227	Fume Hood

Table 6-5
Areas Containing Only Compounds with Greater Than (GT) Qualifiers

Building	Room	Compound	Type
Commercial			
36	102	bis (2-Ethylhexyl) Phthalate	Floor
36	102	Butylbenzyl Phthalate	Floor
36	Cafeteria	Butylbenzyl Phthalate	Floor
37	201	Di-n-Octyl Phthalate	Wall
39	104	Butylbenzyl Phthalate	Floor
39	227	bis (2-Ethylhexyl) Phthalate	Floor
39	227	Butylbenzyl Phthalate	Floor
39	227	Di-n-Butyl Phthalate	Floor
39	248	Butylbenzyl Phthalate	Floor
39	503	Di-n-Butyl Phthalate	Floor
39	514	Di-n-Butyl Phthalate	Floor
39	515	Butylbenzyl Phthalate	Floor
39	515	bis (2-Ethylhexyl) Phthalate	Wall
39	515	Di-n-Octyl Phthalate	Wall
39	527	bis (2-Ethylhexyl) Phthalate	Floor
39	107B	bis (2-Ethylhexyl) Phthalate	Floor
39	107B	Butylbenzyl Phthalate	Floor
39	107B	Di-n-Butyl Phthalate	Floor
39	201/202	Butylbenzyl Phthalate	Floor
39	333A	Di-n-Butyl Phthalate	Floor
97	1	Butylbenzyl Phthalate	Floor
97	143	Butylbenzyl Phthalate	Floor
97	144	Butylbenzyl Phthalate	Floor
97	2 (lab)	Butylbenzyl Phthalate	Floor
97	2 (mach.)	Butylbenzyl Phthalate	Wall
118	1.1	Butylbenzyl Phthalate	Floor
118	1.1	Di-n-Octyl Phthalate	Floor
118	1.2	bis (2-Ethylhexyl) Phthalate	Floor
131	3	bis (2-Ethylhexyl) Phthalate	Floor
131	3	Butylbenzyl Phthalate	Floor
131	39	Butylbenzyl Phthalate	Floor
131	39	Di-n-Octyl Phthalate	Floor
131	39	bis (2-Ethylhexyl) Phthalate	Floor Drain
131	39	Butylbenzyl Phthalate	Floor Drain
131	152	bis (2-Ethylhexyl) Phthalate	Floor
131	152	Di-n-Butyl Phthalate	Floor
131	152	Di-n-Octyl Phthalate	Floor
131	152	bis (2-Ethylhexyl) Phthalate	Wall
131	152	Butylbenzyl Phthalate	Wall
292	119	bis (2-Ethylhexyl) Phthalate	Floor
292	119	Butylbenzyl Phthalate	Floor
292	119	Di-n-Octyl Phthalate	Floor
292	120	bis (2-Ethylhexyl) Phthalate	Floor
292	120	Butylbenzyl Phthalate	Floor
292	120	Di-n-Octyl Phthalate	Floor
292	122	bis (2-Ethylhexyl) Phthalate	Floor
292	125	bis (2-Ethylhexyl) Phthalate	Floor
292	125	Butylbenzyl Phthalate	Floor
292	135	bis (2-Ethylhexyl) Phthalate	Floor

Table 6-5
Areas Containing Only Compounds with Greater Than (GT) Qualifiers (continued)

Building	Room	Compound	Type
292	136	bis (2-Ethylhexyl) Phthalate	Floor
292	136	Butylbenzyl Phthalate	Floor
292	137	bis (2-Ethylhexyl) Phthalate	Floor
292	137	Butylbenzyl Phthalate	Floor
292	138	bis (2-Ethylhexyl) Phthalate	Floor
292	138	Butylbenzyl Phthalate	Floor
292	209	bis (2-Ethylhexyl) Phthalate	Floor
292	209	Butylbenzyl Phthalate	Floor
292	213	bis (2-Ethylhexyl) Phthalate	Floor
292	213	Butylbenzyl Phthalate	Floor
292	213	Di-n-Butyl Phthalate	Floor
292	226	Butylbenzyl Phthalate	Floor
292	227	bis (2-Ethylhexyl) Phthalate	Floor
292	227	Di-n-Butyl Phthalate	Floor
292	233	bis (2-Ethylhexyl) Phthalate	Floor
292	235	bis (2-Ethylhexyl) Phthalate	Floor
292	236	bis (2-Ethylhexyl) Phthalate	Floor
292	236	Butylbenzyl Phthalate	Floor
292	237	Butylbenzyl Phthalate	Floor
292	239	bis (2-Ethylhexyl) Phthalate	Floor
292	239	Butylbenzyl Phthalate	Floor
292	243	Butylbenzyl Phthalate	Floor
292	244	bis (2-Ethylhexyl) Phthalate	Floor
292	244	Butylbenzyl Phthalate	Floor
292	244	bis (2-Ethylhexyl) Phthalate	Wall
292	247	bis (2-Ethylhexyl) Phthalate	Floor
311	10	bis (2-Ethylhexyl) Phthalate	Floor
311	10	Butylbenzyl Phthalate	Wall
311	24	Butylbenzyl Phthalate	Wall
311	24	Di-n-Octyl Phthalate	Wall
311	100	Butylbenzyl Phthalate	Floor
311	100	Di-n-Octyl Phthalate	Floor
311	100	Endrin	Floor
311	100	Butylbenzyl Phthalate	Wall
311	102	bis (2-Ethylhexyl) Phthalate	Floor
311	102	Butylbenzyl Phthalate	Floor
311	104	bis (2-Ethylhexyl) Phthalate	Wall
311	104	Butylbenzyl Phthalate	Wall
311	105	Butylbenzyl Phthalate	Wall
311	109	Butylbenzyl Phthalate	Floor
311	109	Di-n-Octyl Phthalate	Floor
311	109	Endrin	Floor
311	110	Butylbenzyl Phthalate	Floor
311	112	Butylbenzyl Phthalate	Floor
312	110	bis (2-Ethylhexyl) Phthalate	Floor
312	110	Butylbenzyl Phthalate	Floor
312	110	Di-n-Octyl Phthalate	Floor
312	121	bis (2-Ethylhexyl) Phthalate	Floor
312	121	Butylbenzyl Phthalate	Floor
312	121	Di-n-Octyl Phthalate	Floor

Table 6-5
Areas Containing Only Compounds with Greater Than (GT) Qualifiers (continued)

Building	Room	Compound	Type
312	141	bis (2-Ethylhexyl) Phthalate	Floor
312	141	Butylbenzyl Phthalate	Floor
312	142	bis (2-Ethylhexyl) Phthalate	Floor
312	142	Butylbenzyl Phthalate	Floor
312	143	bis (2-Ethylhexyl) Phthalate	Floor
312	143	Butylbenzyl Phthalate	Floor
312	144	bis (2-Ethylhexyl) Phthalate	Floor
312	144	Butylbenzyl Phthalate	Floor
312	199.1	bis (2-Ethylhexyl) Phthalate	Floor
312	199.1	Butylbenzyl Phthalate	Floor
313	1.1	Butylbenzyl Phthalate	Floor
313	119	Butylbenzyl Phthalate	Floor
313	125	bis (2-Ethylhexyl) Phthalate	Floor
313	125	Butylbenzyl Phthalate	Floor
313	129	Butylbenzyl Phthalate	Floor
313	138.1	bis (2-Ethylhexyl) Phthalate	Floor
313	138.1	Butylbenzyl Phthalate	Floor
313	138.1	Di-n-Octyl Phthalate	Floor
313	194	Butylbenzyl Phthalate	Floor
313	194	Butylbenzyl Phthalate	Wall
313	222	Butylbenzyl Phthalate	Fume Hood
313	258	Butylbenzyl Phthalate	Floor

Table 6-6 presents the areas whose remedial status has yet to be determined pending additional information. These areas were not previously sampled during the remedial investigation and will be addressed in the RIP. As stated previously these areas were not included in determining the costs presented in Section 5.

In general, an area such as a room was identified as requiring remediation based on one or two composite wipe samples. Frequently, the sampling was biased toward visible stains. Since remediation of PCBs may require expensive methods such as scabbling, a sampling effort will be conducted to determine the extent of PCB contamination. The estimates in this document are believed to be upper estimates.

2. Perform a pilot study to determine the level of cleanup that can be achieved using the remediation technologies of the selected alternative. A pilot study shall be conducted to evaluate the effectiveness of different remedial techniques. This study will be conducted in a select number of areas that have all types of contamination: explosives, metals, PCBs, BNAs, and pesticides. This pilot study will be focused on surfaces that are most likely to have these contaminants. Different surficial remediation techniques will be used and wipe samples will be taken in order to evaluate the effectiveness of each technique. In those areas where subsurface contamination is suspected, more aggressive techniques will be used to determine the depth of contamination.

3. The results of the above testing will be presented in the RIP along with an evaluation of those results. The recommendation of the Remedial Action Plan, including the areas to be remediated and the recommended cleanup methods, will be modified as necessary.

6.5.2 Remediation Design and Selection of Contractor

The following activities are part of remediation design and selection of contractor:

1. The Remedial Action Plan and the results of the pre-remediation testing discussed above will be used to prepare the Engineering Design and the Construction Plans and Specifications for inclusion in the RIP. The design and specifications will be included as part of the bid package to select a remedial contractor. The Corps of Engineers, New England Division, will select a remediation contractor.

Table 6-6

Rooms Whose Remedial Status Has Yet to be Determined

Building	Room	Use	Reason for TBD Remedial Status
36	Cage	Between 0.1 and 0.2	Proximity to 0.1/0.2
	Fire R.	Between 0.1 and 0.2	Proximity to 0.1/0.2
37	125	Equipment Mgmt. Off.	Proximity to Rm 128
	129		Proximity to Rm 128
	130	Motor Pool Office	Proximity to Rm 128
	131		Proximity to Rm 128
	Pipe Supply	Pipe Supply	Proximity to Rm 113/111
	E. Garage	E. Garage	Proximity to Rm 111
	C. Garage	C. Garage	Proximity to Rm 111
39	109	Off of Rm 108	Proximity to Rm 108
	106		Indoor Workgroup walkthrough
	110	Off of Rm 108	Proximity to Rm 108
	114	Office	Indoor Workgroup walkthrough
	115	Off of Rm 117	Indoor Workgroup walkthrough
	121	Office	Indoor Workgroup walkthrough
	122	Office	Indoor Workgroup walkthrough
	123	Conference Room	Indoor Workgroup walkthrough
	124	Office	Indoor Workgroup walkthrough
	125	Office	Indoor Workgroup walkthrough
	126	Lobby?	Indoor Workgroup walkthrough
	127	Office	Indoor Workgroup walkthrough
	128	Western Part of 127	Indoor Workgroup walkthrough
	129	Office	Indoor Workgroup walkthrough
	130	Office	Indoor Workgroup walkthrough
	131	Office	Indoor Workgroup walkthrough
	132	Office	Indoor Workgroup walkthrough
	134	Office	Indoor Workgroup walkthrough
	143	Office	Indoor Workgroup walkthrough
	160	Off of Rm 159	Proximity to Rm 159
	160B	Office? (161 on floorplan)	Proximity to Rm 159
	166	Off of Rm 163	Proximity to Rm 163
	167	Off of Rm 163	Proximity to Rm 163
	223	Office?	Indoor Workgroup walkthrough
	236	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	237	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	238	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	239	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	240	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	241	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	242	Off of Rms 236A/236B	Proximity to Rms 236A/236B
	244A	Off of Rm 244	Proximity to Rm 244
	244B	Off of Rm 244	Proximity to Rm 244
	333B	Lab	Proximity to Rms 333/333A
	334A	Off of Rm 333B	Proximity to Rm 333B
	337	Off of Rm 328	Proximity to Rm 328

Table 6-6

Rooms Whose Remedial Status Has Yet to be Determined

Building	Room	Use	Reason for TBD Remedial Status
	432	Off of Rm 431	Proximity to Rm 431
	454	Off of Rm 453	Proximity to Rm 453
	502	Off of Rms 501A/503	Proximity to Rms 501A/503
	504	Off of Rm 501A	Proximity to Rm 501A
	504A	Off of Rm 505	Proximity to Rm 505
	531 crn	In corner of Rm 531	Proximity to Rm 531
131	41	Print Shop	Room used as a print shop
	152A	Entry to Rm 152	Proximity to Rm 152
292	118	Off of Rm 119	Proximity to Rm 119
	126		Proximity to Rm 125
	127		Proximity to Rm 125
	Hall	Hall outside 132	Proximity to Rm 132
	Hall	Hall outside 136/137	Proximity to Rms 136/137
	231	Off of Rm 233	Proximity to Rm 233
	234	Off of Rm 235	Proximity to Rm 235
	238	Photolab	Proximity to 237/239. Photolab
	248	Entry to Rm 250	Proximity to Rm 250
312	1.7A	Off of Rm 1.7	Proximity to Rm 1.7
	1.7B	Off of Rm 1.7	Proximity to Rm 1.7
	Office	Off of Rm 1.7	Proximity to Rm 1.7
	Office	Off of Rm 1.7	Proximity to Rm 1.7
	104	Off of Rm 114	Proximity to Rm 114
	106	Hall	Proximity to Rm 114
	108	Off of Rm 110	Proximity to Rm 110
	112	Off of Rm 114	Proximity to Rm 114
	116	Off of Rms 115/117	Proximity t Rms 115/117
	139	Entry to Rm 1.2	Proximity to Rm 1.2
	146	Off of Rms 145/147	Proximity to Rms 145/147
313	7A	Test Chamber Entry	Proximity to Rm 153
	129R	Off of Rm 129	Proximity to Rm 129
	150	Entry to Rm 152	Proximity to Rm 152
	259	Off of Rm 258	Proximity to Rm 258
	153B	Special Test Chamber	Room Use and proximity to Rm 153
	0.4A	Powder Rm	Room Use as a powder room
	Grinding Rm		Room Use as a grinding room
	Dark Rm		Room use as a photo lab

6.5.3 Remedial Action

The following activities are part of remedial action:

1. The recommendation of the Remedial Action Plan and the requirements of the design and specifications in the RIP will be implemented by the remediation contractor. The remediation will consist of cleaning a surface using appropriate techniques and performing wipe sampling to ensure that the surface meets the cleanup limits. More wipe samples will be taken during initial remediation to ensure that the techniques are effectively reducing contamination levels. If the surface does not meet the cleanup limits, additional cleaning will be done using the same or more aggressive techniques.

2. The activities of the remediation contractor will be monitored by the Licensed Site Professional (LSP) of record for the site to ensure that all activities comply with the Massachusetts Contingency Plan.

6.5.4 Post-Remediation Activities

The following activities are part of post-remediation activities:

1. Confirmatory sampling will be performed in selected areas to evaluate the success of the remedial effort in achieving the cleanup limits. The confirmatory sampling will not test every surface but will be designed to provide a level of confidence that the remedial objectives have been met.

2. Remediated surfaces will be repaired in those cases where the structural integrity or safety of the surface may be in question.

3. A final inspection of the remedial activities shall be performed by the LSP of record. A description of the inspection activities will be presented in a Final Inspection Report.

6.6 CONFIRMATORY SAMPLING

Confirmatory sampling will be performed after each stage of remediation to determine if the remediation has successfully achieved cleanup limits. This section discusses the type of confirmatory sampling that will be performed and how the remediation effort will be evaluated.

The general remediation process will start with cleaning an area using the least aggressive remedial method specified in Tables 5-7 and 5-8. After this stage is completed, a round of confirmatory sampling will be conducted. If the cleanup limits are exceeded in any area, that area will be cleaned again, either with the same method or with a more aggressive method. This sequence of cleaning and confirmatory sampling will continue until the cleanup limits are achieved or it is determined that further remediation will not be effective.

Confirmatory sampling will consist of taking wipe samples using the same procedure as was followed during the Phase 2 RI, that is, taking the wipe over a 100 cm^2 area. The wipe sample will be analyzed for the compounds that exceeded the cleanup limits at each location.

There is no regulatory guidance on how many wipe samples should be taken. The indoor risk assessment made the assumption that the risk to human health was proportional to the average compound concentration in a building because occupants are likely to spend time in a number of rooms. Therefore, the risk would seem not to be overly dependent on the concentration on any one spot. That is, small hot spots are unlikely to be significant health hazards. Therefore, a sampling density that is a good estimate of the average concentration of a contaminant is adequate.

The state of New Jersey specifies one wipe sample every 900 ft^2 of surface area up to an area of 9,000 ft^2, at which point one additional sample would be taken for every 9,000 ft^2. An area of 900 ft^2 is approximately the area of a medium-size (20 x 20 ft) room. A method of increasing the accuracy of the sampling is to take composite samples. In the case of wipe samples, that can be done by taking multiple wipe samples and then combining them and analyzing them as one sample.

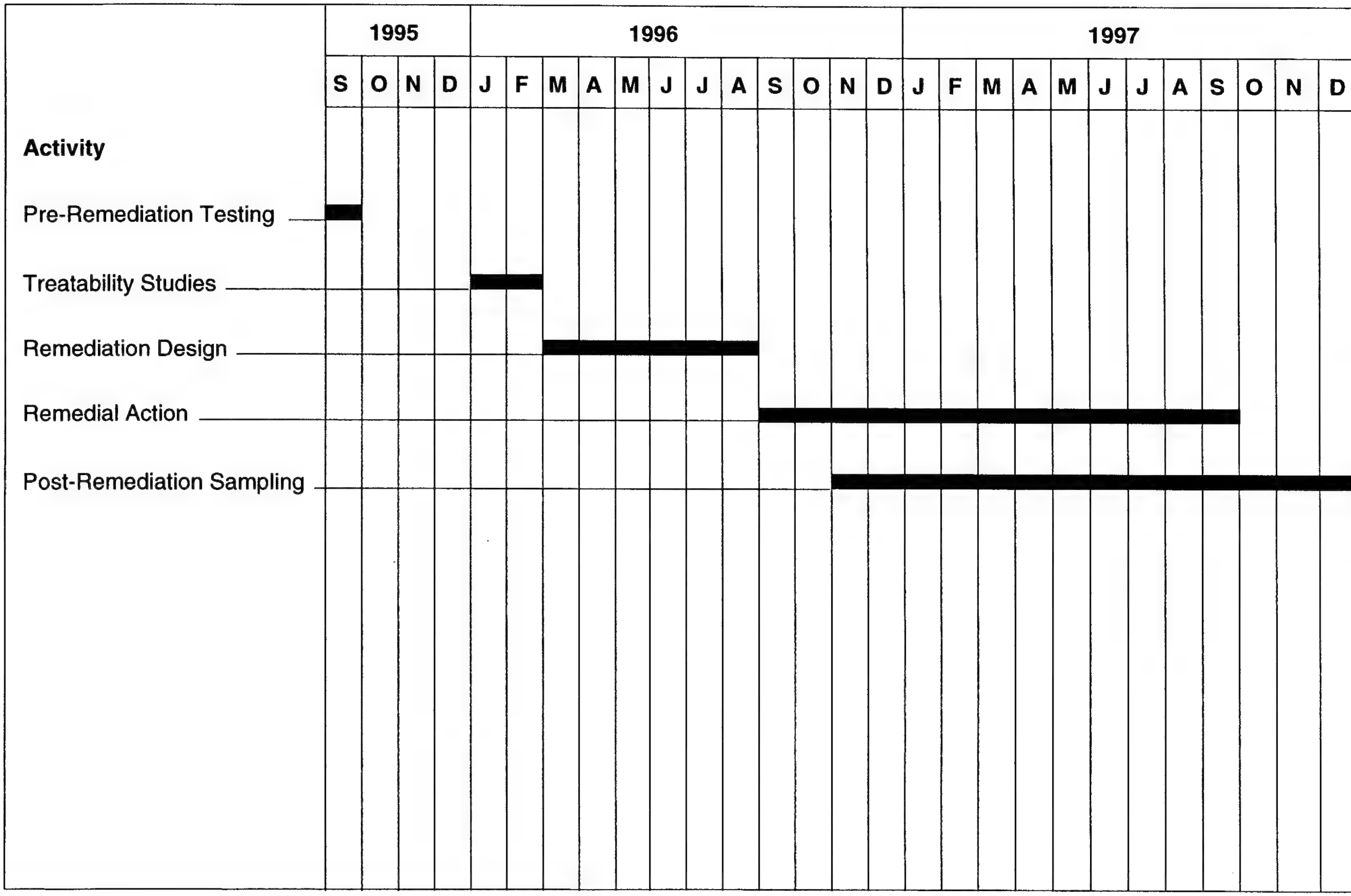
Therefore, in each room to be remediated, a composite sample will be taken for each area to be remediated. For example, one composite sample will be taken on the wall and one on the floor, if both surfaces were remediated. The composite sample will consist of taking

wipe samples at a minimum of five locations. The five wipe samples will be composited into one jar and sent to the laboratory for analysis as one sample.

Because the cleanup limit for each compound was calculated assuming that the risk from that compound was one tenth of the risk permitted by the MCP, it may be possible to meet the MCP prescribed risk limits even though the concentrations of a few compounds exceed the target cleanup goal. Therefore, the total risk will be reevaluated after each remediation stage to determine if the MCP risk limits of 1 X 10^{-5} and Hazard Quotient of 1.0 are met.

6.7 PROJECTED IMPLEMENTATION SCHEDULE

The projected schedule for implementing the remedial alternative at MTL is presented in Figure 6-1.



95P-5643 12/19/95

FIGURE 6-1 IMPLEMENTATION SCHEDULE

SECTION 7

REFERENCES

Cartographic Associates, Inc. 1989. Watertown Zoning Map.

EG&G, Idaho, Inc. 1988. *Preliminary Assessment/Site Inspection for the U.S. Army Materials Technology Laboratory.*

EG&G, Idaho, Inc. 1988. *Technical Plan for the U.S. Army Materials Technology Laboratory Remedial Investigation and Feasibility Study.*

EG&G, Idaho, Inc. 1990. *Draft U.S. Army Materials Technology Laboratory Environmental Investigation Status Report*. Vol. 1 and 2.

EG&G, Idaho, Inc. 1990. *U.S. Army Materials Technology Laboratory Environmental Investigation Status Report*. Vol. 1 and 2.

EPA (U.S. Environmental Protection Agency). 1988. *CERCLA Compliance with Other Laws Manual - Interim Final.* EPA/540/G-89/006.

EPA (U.S. Environmental Protection Agency). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.*

EPA (U.S. Environmental Protection Agency). 1989. *CERCLA Compliance with Other Laws Manual - Part II - Interim Final.* EPA/540/G-89/009.

Little, Arthur D. 1990. *Performance of Sampling Activities at MTL, Watertown, Massachusetts for EG&G Idaho, Inc.*

MADEP (Massachusetts Department of Environmental Protection). *Massachusetts Contingency Plan.* 310CMR40.

Stone and Webster Engineering Corporation. 1992. *General Contractor Specification for the Decommissioning and Decontamination of the U.S. Army Materials Technology Laboratory Facilities, Watertown, Massachusetts*, Vols. 1-3.

TRC Environmental Consultants. 1990. "Asbestos Building Assessments, Army Materials Technology Laboratory."

U.S. Army Toxic and Hazardous Materials Agency. 1980. *Installation Assessment of United States Army Materials and Mechanics Research Center.*

WESTON (Roy. F. Weston, Inc.). 1991. *Army Materials Technology Laboratory Phase 1 Remedial Investigation Report*. Prepared for USAEC. Vol. 1.

WESTON (Roy F. Weston, Inc.). 1992. *Army Materials Technology Laboratory, Radiological Field Survey Report*. Prepared for USAEC.

WESTON (Roy F. Weston, Inc.). 1993. Task Order 1, *Army Materials Technology Laboratory Phase 2 Remedial Investigation for Base Closure, Technical Plans*. Prepared for USAEC.

WESTON (Roy F. Weston, Inc.). 1995. *Army Materials Technology Laboratory Human Health Evaluation of Exposure to Indoor Building Surfaces*. Prepared for USAEC.

U.S. Army Corps of Engineers, New England Division (USACE-NED). 1991. *Army Materials Technology Laboratory Closure - Draft Environmental Impact Statement*.

APPENDIX A

CALCULATION OF CLEAN-UP LIMITS

LIST OF TABLES

CALCULATION OF CLEAN-UP LIMITS

In the indoor human health risk assessment (WESTON, 1995), it was determined that the MADEP limits for carcinogenic and non-carcinogenic risks were exceeded for the indoor surfaces at MTL. The indoor risk assessment also identified 49 compounds that were significant contributors to total risk. In order to meet the MADEP limits, cleanup limits were developed for each of the 49 compounds.

The Massachusetts Contingency Plan (MCP) has limits for carcinogenic and noncarcinogenic risk. The carcinogenic risk is calculated for lifetime exposure and the MCP limit is 1×10^{-5}. The noncarcinogenic effect is calculated for chronic (greater than 7 years) and subchronic (less than 7 years) exposure. The MCP limit is a Hazard Index of 1.0, where the Hazard Index is defined as the ratio of the daily intake to the safe daily intake for noncarcinogenic effects.

The cleanup limits were calculated for each compound by assigning a risk for each compound to one-tenth of the maximum allowed by the State of Massachusetts. This provides a level of conservatism that is adequate to ensure that the sum of the individual risks for all compounds meets the MADEP requirements.

The total carcinogenic or noncarcinogenic risks are calculated for each compound as the sum of the ingestion, dermal, and inhalation pathways using the following equations:

	Carcinogenic	Noncarcinogenic
	Length of Exposure	
Pathway	Lifetime	Subchronic (<7 yrs) Chronic (>7 yrs)
Ingestion	Risk = C * HIF * SF	HQ = C * HIF/RfD
Dermal	Risk = C * HIF * ABS * SF	HQ = C * HIF * ABS/RfD
Inhalation	Risk = C * HIF * RF * SF	HQ = C * HIF * RF/RfD

Where:

Risk	=	Risk of getting cancer from exposure to a chemical.
C	=	Chemical surface concentration (mg/m^2).
HIF	=	Human Intake Factor ($m^3/kg/day$).
SF	=	Slope factor $(mg/kg\text{-}day)^{-1}$
HQ	=	Hazard Quotient or ratio of daily intake to the maximum safe daily intake or reference dose.
ABS	=	Fraction of skin contact exposure that is adsorbed.
RF	=	Resuspension factor (m^{-1}) (ratio of concentration in air to concentration on surface).
RfD	=	Reference Dose (mg/kg-day) (maximum safe dose.)

For a detailed discussion of these factors, see the Human Health Evaluation (WESTON, 1995). Both risk and HQ were summed for the three pathways (ingestion, dermal, and inhalation) to determine the total risk and HQ for each compound. The target risk was set at 1×10^{-6} and the target HQ was set at 0.1 to ensure that the sum of the risks and HQs for all compounds was less than the MCP limits of 1×10^{-5} and 1.0, respectively. The equations were solved for concentration, C, for each of the three exposure durations (subchronic, chronic, and lifetime). The minimum of these three Cs is the risk-based cleanup goal. These calculations are presented in Tables A-1 through A-4 for commercial scenario, renovation worker for commercial scenario, residential scenario, and renovation worker for residential scenario, respectively.

For example, for chronic and subchronic exposures:

$$HQ = C\,[HIF/RfD + HIF * ABS/RfD + HIF * RF/RfD]$$

or

$$HQ = C * \text{Sum of factors for ingestion, dermal, and inhalation}$$

$$C = HQ/\text{Sum of factors}$$

Where:

Factor (ingestion)	=	HIF/RfD
Factor (dermal)	=	HIF * ABS/RfD
Factor (inhalation)	=	HIF * RF/RfD

For each compound HQ was set equal to 0.1, so

C = 0.1/Sum of factors

was calculated for the chronic, subchronic, and lifetime exposure scenarios and the minimum of the three values was selected.

These calculations are presented in Tables A-1 through A-4.

Since many compounds that were found at MTL are commonly found in urban environments, the risk-based cleanup goals were compared against the results of background wipe samples. Background wipe samples for the commercial scenario (Table A-5) were taken at four off-site locations: a firehouse, a lumber yard, an elementary school, and a church. Twenty-three compounds were detected on the off-site wipe samples. Of the 49 compounds that were determined to contribute a significant risk to MTL populations, 12 were found in off-site wipe samples. Background wipe samples for the residential scenario (Table A-6) were taken at three on-site living quarters: Buildings 111, 117, and 118. Of the 49 significant compounds, 21 were found in living quarters samples.

The highest of either the risk-based clean-up goal or the maximum background sample value was selected as the clean-up limit for each use scenario. In some cases, a compound was not detected in background and the risk-based level of no significant risk is at or below the range of analytical detection limits. The range of detection limits for each compound that was obtained during the Remedial Investigation is presented in Table A-7. In addition, the mode, or most common value of the detection limit, is also presented. It is anticipated that the detection limit for confirmatory samples taken during the remediation process may also

be greater than the level of no significant risk, so confirming cleanup to these levels may not be possible.

Lead is handled differently from other compounds. Since there are no EPA-approved toxicity values for lead, a risk-based cleanup goal was not calculated [see Human Health Evaluation (WESTON, 1995) for additional discussion]. In addition, lead was commonly used as a component in paint and so would be expected to be present on painted surfaces. The Army is addressing the issue of lead-based paint under a separate program; therefore, lead-based paint is not considered in this document. However, lead contamination as a result of research or industrial activities does need to be addressed as part of this remedial action plan. Therefore, a background concentration was calculated using the three on-site residential buildings (111, 117, and 118). This background would be representative of the surfaces with lead-based paint, as was widely used throughout the facility, but these buildings would not have been exposed to industrial or research activities.

The risk-based goals, the background concentrations, and selected cleanup limits that were used to identify areas to be remediated are presented in Table A-7. Tables A-8 and A-9 provide listings of all wipe samples that exceeded the cleanup limits .

Tables A-10 and A-11 provide summaries of the total surface areas for surfaces that exceeded cleanup limits and Tables A-12 and A-13 provide details of surface areas for each room where the cleanup limits were exceeded.

An example calculation to determine the levels of no significant risk is presented in Table A-14 using DDT.

Table A-15 presents the on-site residential and off-site commercial wipe sample locations.

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (I)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Antimony														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-04	4.0E-04	NA	9.8E-07	2.5E-03	9.8E-07	2.5E-03	3.5E-07	0.0E+00				
Dermal	1.0E-03	4.0E-05	4.0E-05	NA	9.3E-05	2.3E-03	9.3E-05	2.3E-03	3.5E-05	0.0E+00				
Sum						4.8E-03		4.8E-03		0.0E+00	2.1E+01	2.1E+01	NA	2.1E+01
Arsenic														
Inhalation	NA	NA	NA	1.5E+01	1.9E-02	NA	1.9E-02	NA	6.7E-03	1.0E-06				
Ingestion	NA	3.0E-04	3.0E-04	1.8E+00	9.8E-07	3.3E-03	9.8E-07	3.3E-03	3.5E-07	6.3E-07				
Dermal	1.0E-03	2.9E-04	2.9E-04	1.8E+00	9.3E-05	3.2E-04	9.3E-05	3.2E-04	3.5E-05	6.3E-08				
Sum						3.6E-03		3.6E-03		1.7E-06	2.8E+01	2.8E+01	5.9E-01	5.9E-01
Barium														
Inhalation	NA	1.4E-04	1.4E-03	NA	1.9E-02	1.4E-03	1.9E-02	1.4E-04	6.7E-03	0.0E+00				
Ingestion	NA	7.0E-02	7.0E-02	NA	9.8E-07	1.4E-05	9.8E-07	1.4E-05	3.5E-07	0.0E+00				
Dermal	1.0E-03	7.0E-03	7.0E-03	NA	9.3E-05	1.3E-05	9.3E-05	1.3E-05	3.5E-05	0.0E+00				
Sum						1.4E-03		1.6E-04		0.0E+00	7.2E+01	6.1E+02	NA	7.2E+01
Beryllium														
Inhalation	NA	NA	NA	8.4E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	5.6E-07				
Ingestion	NA	5.0E-03	5.0E-03	4.3E+00	9.8E-07	2.0E-04	9.8E-07	2.0E-04	3.5E-07	1.5E-06				
Dermal	1.0E-03	2.5E-05	2.5E-05	8.6E+02	9.3E-05	3.7E-03	9.3E-05	3.7E-03	3.5E-05	3.0E-05				
Sum						3.9E-03		3.9E-03		3.2E-05	2.6E+01	2.6E+01	3.1E-02	3.1E-02
Cadmium														
Inhalation	NA	NA	NA	6.1E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	4.1E-07				
Ingestion	NA	1.0E-03	NA	NA	9.8E-07	9.8E-04	9.8E-07	NA	3.5E-07	0.0E+00				
Dermal	1.0E-02	2.5E-05	NA	NA	9.3E-05	3.7E-02	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						3.8E-02		NA		4.1E-07	2.6E+00	NA	2.4E+00	2.4E+00
Chromium VI														
Inhalation	NA	NA	1.1E-06	4.2E+01	1.9E-02	NA	1.9E-02	1.7E-01	6.7E-03	2.8E-06				
Ingestion	NA	5.0E-03	2.0E-02	NA	9.8E-07	2.0E-04	9.8E-07	4.9E-05	3.5E-07	0.0E+00				
Dermal	1.0E-03	2.5E-04	1.0E-03	NA	9.3E-05	3.7E-04	9.3E-05	9.3E-05	3.5E-05	0.0E+00				
Sum						5.7E-04		1.7E-01		2.8E-06	1.8E+02	5.8E-01	3.6E-01	3.6E-01
Lead and compounds														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	NA	NA	NA	9.8E-07	NA	9.8E-07	NA	3.5E-07	0.0E+00				
Dermal	6.0E-03	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						NA		NA		0.0E+00	NA	NA	NA	NA

Note: Re-suspension Factor (SF) = 1 E-05

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (I)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (I)	Factor (I)				
Mercury, inorganic														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	9.8E-07	3.3E-03	9.8E-07	3.3E-03	3.5E-07	0.0E+00				
Dermal	1.0E-03	6.0E-06	6.0E-06	NA	9.3E-05	1.6E-02	9.3E-05	1.6E-02	3.5E-05	0.0E+00				
Sum						1.9E-02		1.9E-02		0.0E+00	5.3E+00	5.3E+00	NA	5.3E+00
Nickel														
Inhalation	NA	NA	NA	8.4E-01	1.9E-02	NA	1.9E-02	NA	6.7E-03	5.6E-08				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	3.5E-07	0.0E+00				
Dermal	NA	1.0E-03	1.0E-03	NA	9.3E-05	0.0E+00	9.3E-05	0.0E+00	3.5E-05	0.0E+00				
Sum						4.9E-05		4.9E-05		5.6E-08	2.0E+03	2.0E+03	1.8E+01	1.8E+01
Silver														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	5.0E-03	5.0E-03	NA	9.8E-07	2.0E-04	9.8E-07	2.0E-04	3.5E-07	0.0E+00				
Dermal	1.0E-02	2.5E-04	2.5E-04	NA	9.3E-05	3.7E-03	9.3E-05	3.7E-03	3.5E-05	0.0E+00				
Sum						3.9E-03		3.9E-03		0.0E+00	2.6E+01	2.6E+01	NA	2.6E+01
Vanadium														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	7.0E-03	7.0E-03	NA	9.8E-07	1.4E-04	9.8E-07	1.4E-04	3.5E-07	0.0E+00				
Dermal	1.0E-03	7.0E-05	7.0E-05	NA	9.3E-05	1.3E-03	9.3E-05	1.3E-03	3.5E-05	0.0E+00				
Sum						1.5E-03		1.5E-03		0.0E+00	6.8E+01	6.8E+01	NA	6.8E+01
Cyanide (free)														
Inhalation	NA	2.0E-03	2.9E-04	NA	1.9E-02	9.5E-05	1.9E-02	6.6E-04	6.7E-03	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	3.5E-07	0.0E+00				
Dermal	3.0E-02	2.0E-02	2.0E-02	NA	9.3E-05	1.4E-04	9.3E-05	1.4E-04	3.5E-05	0.0E+00				
Sum						2.8E-04		8.4E-04		0.0E+00	3.5E+02	1.2E+02	NA	1.2E+02
Nitrate/nitrite														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	1.0E-01	1.0E-01	NA	9.8E-07	9.8E-06	9.8E-07	9.8E-06	3.5E-07	0.0E+00				
Dermal	1.0E-03	1.0E-01	1.0E-01	NA	9.3E-05	9.3E-07	9.3E-05	9.3E-07	3.5E-05	0.0E+00				
Sum						1.1E-05		1.1E-05		0.0E+00	9.3E+03	9.3E+03	NA	9.3E+03
Acenaphthene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	6.0E-02	6.0E-01	NA	9.8E-07	1.6E-05	9.8E-07	1.6E-06	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						1.6E-05		1.6E-06		0.0E+00	6.1E+03	6.1E+04	NA	6.1E+03

Note: Re-suspension Factor (SF) = 1 E-05

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Acenaphthylene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Anthracene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	3.0E-01	3.0E+00	NA	9.8E-07	3.3E-06	9.8E-07	3.3E-07	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						3.3E-06		3.3E-07		0.0E+00	3.1E+04	3.1E+05	NA	3.1E+04
Benzo(a) Anthracene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	2.6E-06				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		2.6E-06	4.1E+03	4.1E+03	3.9E-01	3.9E-01
Benzo(a)pyrene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	2.6E-06				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		2.6E-06	4.1E+03	4.1E+03	3.9E-01	3.9E-01
Benzo(b)Fluoranthene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	2.6E-06				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		2.6E-06	4.1E+03	4.1E+03	3.9E-01	3.9E-01
Benzo(g,h,i)perylene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Benzo(k)fluoranthene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	2.6E-06				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		2.6E-06	4.1E+03	4.1E+03	3.9E-01	3.9E-01

Note: Re-suspension Factor (SF) = 1 E-05

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Chrysene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	2.6E-06				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		2.6E-06	4.1E+03	4.1E+03	3.9E-01	3.9E-01
Dibenzo(a,h)Anthracene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	2.6E-06				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		2.6E-06	4.1E+03	4.1E+03	3.9E-01	3.9E-01
Fluoranthene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Fluorene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-01	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-06	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-06		0.0E+00	4.1E+03	4.1E+04	NA	4.1E+03
Methylnaphthalene, 2-														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Naphthalene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Phenanthrene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	9.8E-07	3.3E-05	9.8E-07	3.3E-06	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						3.3E-05		3.3E-06		0.0E+00	3.1E+03	3.1E+04	NA	3.1E+03

Note: Re-suspension Factor (SF) = 1 E-05

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (I)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Pyrene														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	9.8E-07	3.3E-05	9.8E-07	3.3E-06	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						3.3E-05		3.3E-06		0.0E+00	3.1E+03	3.1E+04	NA	3.1E+03
Bis(2-ethylhexyl)phthalate														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	1.4E-02	9.8E-07	4.9E-05	9.8E-07	4.9E-05	3.5E-07	4.9E-09				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	9.3E-05	0.0E+00	9.3E-05	0.0E+00	3.5E-05	0.0E+00				
Sum						4.9E-05		4.9E-05		4.9E-09	2.0E+03	2.0E+03	2.0E+02	2.0E+02
Butylbenzyl phthalate														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	2.0E-01	2.0E+00	NA	9.8E-07	4.9E-06	9.8E-07	4.9E-07	3.5E-07	0.0E+00				
Dermal	NA	2.0E-01	2.0E+00	NA	9.3E-05	0.0E+00	9.3E-05	0.0E+00	3.5E-05	0.0E+00				
Sum						4.9E-06		4.9E-07		0.0E+00	2.0E+04	2.0E+05	NA	2.0E+04
Di-n-butyl phthalate														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	1.0E-01	1.0E+00	NA	9.8E-07	9.8E-06	9.8E-07	9.8E-07	3.5E-07	0.0E+00				
Dermal	NA	NA	NA	NA	9.3E-05	NA	9.3E-05	NA	3.5E-05	0.0E+00				
Sum						9.8E-06		9.8E-07		0.0E+00	1.0E+04	1.0E+05	NA	1.0E+04
Di-n-octyl phthalate														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	3.5E-07	0.0E+00				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	9.3E-05	0.0E+00	9.3E-05	0.0E+00	3.5E-05	0.0E+00				
Sum						4.9E-05		4.9E-05		0.0E+00	2.0E+03	2.0E+03	NA	2.0E+03
Aldrin														
Inhalation	NA	NA	NA	1.7E+01	1.9E-02	NA	1.9E-02	NA	6.7E-03	1.1E-06				
Ingestion	NA	3.0E-05	3.0E-05	1.7E+01	9.8E-07	3.3E-02	9.8E-07	3.3E-02	3.5E-07	6.0E-06				
Dermal	1.0E-02	3.0E-05	3.0E-05	1.7E+01	9.3E-05	3.1E-02	9.3E-05	3.1E-02	3.5E-05	6.0E-06				
Sum						6.4E-02		6.4E-02		1.3E-05	1.6E+00	1.6E+00	7.7E-02	7.7E-02
Alpha-Endosulfan														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	9.8E-07	2.0E-02	9.8E-07	4.9E-03	3.5E-07	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	9.3E-05	1.9E-02	9.3E-05	4.7E-03	3.5E-05	0.0E+00				
Sum						3.8E-02		9.6E-03		0.0E+00	2.6E+00	1.0E+01	NA	2.6E+00

Note: Re-suspension Factor (SF) = 1 E-05

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime					
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)	Chronic	Subchronic	Lifetime	
Beta-Endosulfan														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	9.8E-07	2.0E-02	9.8E-07	4.9E-03	3.5E-07	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	9.3E-05	1.9E-02	9.3E-05	4.7E-03	3.5E-05	0.0E+00				
Sum						3.8E-02		9.6E-03		0.0E+00	2.6E+00	1.0E+01	NA	2.6E+00
DDD, 4,4'-														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	NA	NA	2.4E-01	9.8E-07	NA	9.8E-07	NA	3.5E-07	8.4E-08				
Dermal	1.0E-02	NA	NA	2.4E-01	9.3E-05	NA	9.3E-05	NA	3.5E-05	8.4E-08				
Sum						NA		NA		1.7E-07	NA	NA	6.0E+00	6.0E+00
DDE, 4,4'-														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	NA	NA	3.4E-01	9.8E-07	NA	9.8E-07	NA	3.5E-07	1.2E-07				
Dermal	1.0E-02	NA	NA	3.4E-01	9.3E-05	NA	9.3E-05	NA	3.5E-05	1.2E-07				
Sum						NA		NA		2.4E-07	NA	NA	4.2E+00	4.2E+00
DDT, 4,4'-														
Inhalation	NA	NA	NA	3.4E-01	1.9E-02	NA	1.9E-02	NA	6.7E-03	2.3E-08				
Ingestion	NA	5.0E-04	5.0E-04	3.4E-01	9.8E-07	2.0E-03	9.8E-07	2.0E-03	3.5E-07	1.2E-07				
Dermal	1.0E-02	5.0E-04	5.0E-04	3.4E-01	9.3E-05	1.9E-03	9.3E-05	1.9E-03	3.5E-05	1.2E-07				
Sum						3.8E-03		3.8E-03		2.6E-07	2.6E+01	2.6E+01	3.8E+00	3.8E+00
Dieldrin														
Inhalation	NA	NA	NA	1.6E+01	1.9E-02	NA	1.9E-02	NA	6.7E-03	1.1E-06				
Ingestion	NA	5.0E-05	5.0E-05	1.6E+01	9.8E-07	2.0E-02	9.8E-07	2.0E-02	3.5E-07	5.6E-06				
Dermal	1.0E-02	5.0E-05	5.0E-05	1.6E+01	9.3E-05	1.9E-02	9.3E-05	1.9E-02	3.5E-05	5.6E-06				
Sum						3.8E-02		3.8E-02		1.2E-05	2.6E+00	2.6E+00	8.1E-02	8.1E-02
Endrin														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	9.8E-07	3.3E-03	9.8E-07	3.3E-03	3.5E-07	0.0E+00				
Dermal	1.0E-02	3.0E-04	3.0E-04	NA	9.3E-05	3.1E-03	9.3E-05	3.1E-03	3.5E-05	0.0E+00				
Sum						6.4E-03		6.4E-03		0.0E+00	1.6E+01	1.6E+01	NA	1.6E+01
Gamma BHC (Lindane)														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-03	1.3E+00	9.8E-07	3.3E-03	9.8E-07	3.3E-04	3.5E-07	4.6E-07				
Dermal	1.0E-02	3.0E-04	3.0E-03	1.3E+00	9.3E-05	3.1E-03	9.3E-05	3.1E-04	3.5E-05	4.6E-07				
Sum						6.4E-03		6.4E-04		9.1E-07	1.6E+01	1.6E+02	1.1E+00	1.1E+00

Note: Re-suspension Factor (SF) = 1 E-05

Table A-1
Calculation of Levels of No Significant Risk for Commercial Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Heptachlor														
Inhalation	NA	NA	NA	4.5E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	3.0E-07				
Ingestion	NA	5.0E-04	5.0E-04	4.5E+00	9.8E-07	2.0E-03	9.8E-07	2.0E-03	3.5E-07	1.6E-06				
Dermal	1.0E-02	5.0E-04	5.0E-04	4.5E+00	9.3E-05	1.9E-03	9.3E-05	1.9E-03	3.5E-05	1.6E-06				
Sum						3.8E-03		3.8E-03		3.5E-06	2.6E+01	2.6E+01	2.9E-01	2.9E-01
Heptachlor Epoxide														
Inhalation	NA	NA	NA	9.1E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	6.1E-07				
Ingestion	NA	1.3E-05	1.3E-05	9.1E+00	9.8E-07	7.5E-02	9.8E-07	7.5E-02	3.5E-07	3.2E-06				
Dermal	1.0E-02	1.3E-05	1.3E-05	9.1E+00	9.3E-05	7.2E-02	9.3E-05	7.2E-02	3.5E-05	3.2E-06				
Sum						1.5E-01		1.5E-01		7.0E-06	6.8E-01	6.8E-01	1.4E-01	1.4E-01
Methoxychlor														
Inhalation	NA	NA	NA	9.1E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	6.1E-07				
Ingestion	NA	5.0E-03	5.0E-03	9.1E+00	9.8E-07	2.0E-04	9.8E-07	2.0E-04	3.5E-07	3.2E-06				
Dermal	NA	5.0E-03	5.0E-03	9.1E+00	9.3E-05	0.0E+00	9.3E-05	0.0E+00	3.5E-05	0.0E+00				
Sum						2.0E-04		2.0E-04		3.8E-06	5.1E+02	5.1E+02	2.6E-01	2.6E-01
PCB 1254														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	9.8E-07	1.4E-02	9.8E-07	1.4E-02	3.5E-07	2.7E-06				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	9.3E-05	8.3E-02	9.3E-05	8.3E-02	3.5E-05	1.7E-05				
Sum						9.7E-02		9.7E-02		2.0E-05	1.0E+00	1.0E+00	5.1E-02	5.1E-02
PCB 1260														
Inhalation	NA	NA	NA	NA	1.9E-02	NA	1.9E-02	NA	6.7E-03	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	9.8E-07	1.4E-02	9.8E-07	1.4E-02	3.5E-07	2.7E-06				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	9.3E-05	8.3E-02	9.3E-05	8.3E-02	3.5E-05	1.7E-05				
Sum						9.7E-02		9.7E-02		2.0E-05	1.0E+00	1.0E+00	5.1E-02	5.1E-02
Dinitrotoluene														
Inhalation	NA	NA	NA	9.1E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	6.1E-07				
Ingestion	NA	2.0E-03	2.0E-03	6.8E-02	9.8E-07	4.9E-04	9.8E-07	4.9E-04	3.5E-07	2.4E-08				
Dermal	1.0E-02	2.0E-03	2.0E-03	6.8E-02	9.3E-05	4.7E-04	9.3E-05	4.7E-04	3.5E-05	2.4E-08				
Sum						9.6E-04		9.6E-04		6.6E-07	1.0E+02	1.0E+02	1.5E+00	1.5E+00
RDX														
Inhalation	NA	NA	NA	9.1E+00	1.9E-02	NA	1.9E-02	NA	6.7E-03	6.1E-07				
Ingestion	NA	3.0E-03	3.0E-03	1.1E-01	9.8E-07	3.3E-04	9.8E-07	3.3E-04	3.5E-07	3.9E-08				
Dermal	1.0E-02	3.0E-03	3.0E-03	1.1E-01	9.3E-05	3.1E-04	9.3E-05	3.1E-04	3.5E-05	3.9E-08				
Sum						6.4E-04		6.4E-04		6.9E-07	1.6E+02	1.6E+02	1.5E+00	1.5E+00

Note: Re-suspension Factor (SF) = 1 E-05

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Antimony														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-04	4.0E-04	NA	9.8E-07	2.5E-03	9.8E-07	2.5E-03	1.4E-08	0.0E+00				
Dermal	1.0E-03	4.0E-05	4.0E-05	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.5E-03		2.5E-03		0.0E+00	4.1E+01	4.1E+01	NA	4.1E+01
Arsenic														
Inhalation	NA	NA	NA	1.5E+01	3.9E-02	NA	3.9E-02	NA	5.6E-04	8.4E-07				
Ingestion	NA	3.0E-04	3.0E-04	1.8E+00	9.8E-07	3.3E-03	9.8E-07	3.3E-03	1.4E-08	2.5E-08				
Dermal	1.0E-03	2.9E-04	2.9E-04	1.8E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-03		8.7E-07	3.1E+01	3.1E+01	1.2E+00	1.2E+00
Barium														
Inhalation	NA	1.4E-04	1.4E-03	NA	3.9E-02	2.8E-02	3.9E-02	2.8E-03	5.6E-04	0.0E+00				
Ingestion	NA	7.0E-02	7.0E-02	NA	9.8E-07	1.4E-05	9.8E-07	1.4E-05	1.4E-08	0.0E+00				
Dermal	1.0E-03	7.0E-03	7.0E-03	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.8E-02		2.8E-03		0.0E+00	3.6E+00	3.6E+01	NA	3.6E+00
Beryllium														
Inhalation	NA	NA	NA	8.4E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	4.7E-07				
Ingestion	NA	5.0E-03	5.0E-03	4.3E+00	9.8E-07	2.0E-04	9.8E-07	2.0E-04	1.4E-08	6.0E-08				
Dermal	1.0E-03	2.5E-05	2.5E-05	8.6E+02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		2.0E-04		5.3E-07	5.1E+02	5.1E+02	1.9E+00	1.9E+00
Cadmium														
Inhalation	NA	NA	NA	6.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	3.4E-07				
Ingestion	NA	1.0E-03	NA	NA	9.8E-07	9.8E-04	9.8E-07	NA	1.4E-08	0.0E+00				
Dermal	1.0E-02	2.5E-05	NA	NA	NA	0.0E+00	NA	NA	NA	0.0E+00				
Sum						9.8E-04		NA		3.4E-07	1.0E+02	NA	2.9E+00	2.9E+00
Chromium VI														
Inhalation	NA	NA	1.1E-06	4.2E+01	3.9E-02	NA	3.9E-02	3.5E-01	5.6E-04	2.4E-06				
Ingestion	NA	5.0E-03	2.0E-02	NA	9.8E-07	2.0E-04	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	1.0E-03	2.5E-04	1.0E-03	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		3.5E-01		2.4E-06	5.1E+02	2.8E-01	4.3E-01	2.8E-01
Lead and compounds														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	NA	NA	NA	9.8E-07	NA	9.8E-07	NA	1.4E-08	0.0E+00				
Dermal	6.0E-03	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						NA		NA		0.0E+00	NA	NA	NA	0.0E+00

Note: Re-suspension Factor (RF) = 1 E-04

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Mercury, inorganic														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	9.8E-07	3.3E-03	9.8E-07	3.3E-03	1.4E-08	0.0E+00				
Dermal	1.0E-03	6.0E-06	6.0E-06	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-03		0.0E+00	3.1E+01	3.1E+01	NA	3.1E+01
Nickel														
Inhalation	NA	NA	NA	8.4E-01	3.9E-02	NA	3.9E-02	NA	5.6E-04	4.7E-08				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	NA	1.0E-03	1.0E-03	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-05		4.9E-05		4.7E-08	2.0E+03	2.0E+03	2.1E+01	2.1E+01
Silver														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	5.0E-03	5.0E-03	NA	9.8E-07	2.0E-04	9.8E-07	2.0E-04	1.4E-08	0.0E+00				
Dermal	1.0E-02	2.5E-04	2.5E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		2.0E-04		0.0E+00	5.1E+02	5.1E+02	NA	5.1E+02
Vanadium														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	7.0E-03	7.0E-03	NA	9.8E-07	1.4E-04	9.8E-07	1.4E-04	1.4E-08	0.0E+00				
Dermal	1.0E-03	7.0E-05	7.0E-05	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						1.4E-04		1.4E-04		0.0E+00	7.1E+02	7.1E+02	NA	7.1E+02
Cyanide (free)														
Inhalation	NA	2.0E-03	2.9E-04	NA	3.9E-02	2.0E-04	3.9E-02	1.3E-03	5.6E-04	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	3.0E-02	2.0E-02	2.0E-02	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.4E-04		1.4E-03		0.0E+00	4.1E+02	7.2E+01	NA	7.2E+01
Nitrate/nitrite														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	1.0E-01	1.0E-01	NA	9.8E-07	9.8E-06	9.8E-07	9.8E-06	1.4E-08	0.0E+00				
Dermal	1.0E-03	1.0E-01	1.0E-01	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						9.8E-06		9.8E-06		0.0E+00	1.0E+04	1.0E+04	NA	1.0E+04
Acenaphthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	6.0E-02	6.0E-01	NA	9.8E-07	1.6E-05	9.8E-07	1.6E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						1.6E-05		1.6E-06		0.0E+00	6.1E+03	6.1E+04	NA	6.1E+03

Note: Re-suspension Factor (RF) = 1 E-04

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime					
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)	Chronic	Subchronic	Lifetime	
Acenaphthylene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Anthracene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	3.0E-01	3.0E+00	NA	9.8E-07	3.3E-06	9.8E-07	3.3E-07	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						3.3E-06		3.3E-07		0.0E+00	3.1E+04	3.1E+05	NA	3.1E+04
Benzo(a) Anthracene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Benzo(a)pyrene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Benzo(b)Fluoranthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Benzo(g,h,i)perylene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Benzo(k)fluoranthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00

Note: Re-suspension Factor (RF) = 1 E-04

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime					
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)	Chronic	Subchronic	Lifetime	
Chrysene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Dibenzo(a,h)Anthracene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Fluoranthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Fluorene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-01	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-06		0.0E+00	4.1E+03	4.1E+04	NA	4.1E+03
Methylnaphthalene, 2-														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Naphthalene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Phenanthrene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	9.8E-07	3.3E-05	9.8E-07	3.3E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						3.3E-05		3.3E-06		0.0E+00	3.1E+03	3.1E+04	NA	3.1E+03

Note: Re-suspension Factor (RF) = 1 E-04

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Pyrene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	9.8E-07	3.3E-05	9.8E-07	3.3E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						3.3E-05		3.3E-06		0.0E+00	3.1E+03	3.1E+04	NA	3.1E+03
Bis(2-ethylhexyl)phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	1.4E-02	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	2.0E-10				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-05		4.9E-05		2.0E-10	2.0E+03	2.0E+03	5.1E+03	2.0E+03
Butylbenzyl phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	2.0E-01	2.0E+00	NA	9.8E-07	4.9E-06	9.8E-07	4.9E-07	1.4E-08	0.0E+00				
Dermal	NA	2.0E-01	2.0E+00	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-06		4.9E-07		0.0E+00	2.0E+04	2.0E+05	NA	2.0E+04
Di-n-butyl phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	1.0E-01	1.0E+00	NA	9.8E-07	9.8E-06	9.8E-07	9.8E-07	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						9.8E-06		9.8E-07		0.0E+00	1.0E+04	1.0E+05	NA	1.0E+04
Di-n-octyl phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-05		4.9E-05		0.0E+00	2.0E+03	2.0E+03	NA	2.0E+03
Aldrin														
Inhalation	NA	NA	NA	1.7E+01	3.9E-02	NA	3.9E-02	NA	5.6E-04	9.5E-07				
Ingestion	NA	3.0E-05	3.0E-05	1.7E+01	9.8E-07	3.3E-02	9.8E-07	3.3E-02	1.4E-08	2.4E-07				
Dermal	1.0E-02	3.0E-05	3.0E-05	1.7E+01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-02		3.3E-02		1.2E-06	3.1E+00	3.1E+00	8.4E-01	8.4E-01
Alpha-Endosulfan														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	9.8E-07	2.0E-02	9.8E-07	4.9E-03	1.4E-08	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-02		4.9E-03		0.0E+00	5.1E+00	2.0E+01	NA	5.1E+00

Note: Re-suspension Factor (RF) = 1 E-04

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Beta-Endosulfan														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	9.8E-07	2.0E-02	9.8E-07	4.9E-03	1.4E-08	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-02		4.9E-03		0.0E+00	5.1E+00	2.0E+01	NA	5.1E+00
DDD, 4,4'-														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	NA	NA	2.4E-01	9.8E-07	NA	9.8E-07	NA	1.4E-08	3.4E-09				
Dermal	1.0E-02	NA	NA	2.4E-01	NA	NA	NA	NA	NA	0.0E+00				
Sum						NA		NA		3.4E-09	NA	NA	3.0E+02	3.0E+02
DDE, 4,4'-														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	NA	NA	3.4E-01	9.8E-07	NA	9.8E-07	NA	1.4E-08	4.8E-09				
Dermal	1.0E-02	NA	NA	3.4E-01	NA	NA	NA	NA	NA	0.0E+00				
Sum						NA		NA		4.8E-09	NA	NA	2.1E+02	2.1E+02
DDT, 4,4'-														
Inhalation	NA	NA	NA	3.4E-01	3.9E-02	NA	3.9E-02	NA	5.6E-04	1.9E-08				
Ingestion	NA	5.0E-04	5.0E-04	3.4E-01	9.8E-07	2.0E-03	9.8E-07	2.0E-03	1.4E-08	4.8E-09				
Dermal	1.0E-02	5.0E-04	5.0E-04	3.4E-01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-03		2.0E-03		2.4E-08	5.1E+01	5.1E+01	4.2E+01	4.2E+01
Dieldrin														
Inhalation	NA	NA	NA	1.6E+01	3.9E-02	NA	3.9E-02	NA	5.6E-04	9.0E-07				
Ingestion	NA	5.0E-05	5.0E-05	1.6E+01	9.8E-07	2.0E-02	9.8E-07	2.0E-02	1.4E-08	2.2E-07				
Dermal	1.0E-02	5.0E-05	5.0E-05	1.6E+01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-02		2.0E-02		1.1E-06	5.1E+00	5.1E+00	8.9E-01	8.9E-01
Endrin														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	9.8E-07	3.3E-03	9.8E-07	3.3E-03	1.4E-08	0.0E+00				
Dermal	1.0E-02	3.0E-04	3.0E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-03		0.0E+00	3.1E+01	3.1E+01	NA	3.1E+01
Gamma BHC (Lindane)														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-03	1.3E+00	9.8E-07	3.3E-03	9.8E-07	3.3E-04	1.4E-08	1.8E-08				
Dermal	1.0E-02	3.0E-04	3.0E-03	1.3E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-04		1.8E-08	3.1E+01	3.1E+02	5.5E+01	3.1E+01

Note: Re-suspension Factor (RF) = 1 E-04

Table A-2
Calculation of Levels of No Significant Risk for Commercial Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Heptachlor														
Inhalation	NA	NA	NA	4.5E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	2.5E-07				
Ingestion	NA	5.0E-04	5.0E-04	4.5E+00	9.8E-07	2.0E-03	9.8E-07	2.0E-03	1.4E-08	6.3E-08				
Dermal	1.0E-02	5.0E-04	5.0E-04	4.5E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-03		2.0E-03		3.2E-07	5.1E+01	5.1E+01	3.2E+00	3.2E+00
Heptachlor Epoxide														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	5.1E-07				
Ingestion	NA	1.3E-05	1.3E-05	9.1E+00	9.8E-07	7.5E-02	9.8E-07	7.5E-02	1.4E-08	1.3E-07				
Dermal	1.0E-02	1.3E-05	1.3E-05	9.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						7.5E-02		7.5E-02		6.4E-07	1.3E+00	1.3E+00	1.6E+00	1.3E+00
Methoxychlor														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	5.1E-07				
Ingestion	NA	5.0E-03	5.0E-03	9.1E+00	9.8E-07	2.0E-04	9.8E-07	2.0E-04	1.4E-08	1.3E-07				
Dermal	NA	5.0E-03	5.0E-03	9.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		2.0E-04		6.4E-07	5.1E+02	5.1E+02	1.6E+00	1.6E+00
PCB 1254														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	9.8E-07	1.4E-02	9.8E-07	1.4E-02	1.4E-08	1.1E-07				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						1.4E-02		1.4E-02		1.1E-07	7.1E+00	7.1E+00	9.3E+00	7.1E+00
PCB 1260														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-04	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	9.8E-07	1.4E-02	9.8E-07	1.4E-02	1.4E-08	1.1E-07				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						1.4E-02		1.4E-02		1.1E-07	7.1E+00	7.1E+00	9.3E+00	7.1E+00
Dinitrotoluene														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	5.1E-07				
Ingestion	NA	2.0E-03	2.0E-03	6.8E-02	9.8E-07	4.9E-04	9.8E-07	4.9E-04	1.4E-08	9.5E-10				
Dermal	1.0E-02	2.0E-03	2.0E-03	6.8E-02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-04		4.9E-04		5.1E-07	2.0E+02	2.0E+02	2.0E+00	2.0E+00
RDX														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-04	5.1E-07				
Ingestion	NA	3.0E-03	3.0E-03	1.1E-01	9.8E-07	3.3E-04	9.8E-07	3.3E-04	1.4E-08	1.5E-09				
Dermal	1.0E-02	3.0E-03	3.0E-03	1.1E-01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-04		3.3E-04		5.1E-07	3.1E+02	3.1E+02	2.0E+00	2.0E+00

Note: Re-suspension Factor (RF) = 1 E-04

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Antimony														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-04	4.0E-04	NA	5.7E-05	1.4E-01	9.1E-05	2.3E-01	9.7E-06	0.0E+00				
Dermal	1.0E-03	4.0E-05	4.0E-05	NA	2.3E-04	5.8E-03	2.7E-04	6.8E-03	9.2E-05	0.0E+00				
Sum						1.5E-01		2.3E-01		0.0E+00	6.7E-01	4.3E-01	NA	4.3E-01
Arsenic														
Inhalation	NA	NA	NA	1.5E+01	1.7E-01	NA	2.7E-01	NA	2.9E-02	4.4E-06				
Ingestion	NA	3.0E-04	3.0E-04	1.8E+00	5.7E-05	1.9E-01	9.1E-05	3.0E-01	9.7E-06	1.7E-05				
Dermal	1.0E-03	2.9E-04	2.9E-04	1.8E+00	2.3E-04	7.9E-04	2.7E-04	9.3E-04	9.2E-05	1.7E-07				
Sum						1.9E-01		3.0E-01		2.2E-05	5.2E-01	3.3E-01	4.6E-02	4.6E-02
Barium														
Inhalation	NA	1.4E-04	1.4E-03	NA	1.7E-01	1.2E-02	2.7E-01	1.9E-03	2.9E-02	0.0E+00				
Ingestion	NA	7.0E-02	7.0E-02	NA	5.7E-05	8.1E-04	9.1E-05	1.3E-03	9.7E-06	0.0E+00				
Dermal	1.0E-03	7.0E-03	7.0E-03	NA	2.3E-04	3.3E-05	2.7E-04	3.9E-05	9.2E-05	0.0E+00				
Sum						1.3E-02		3.3E-03		0.0E+00	7.7E+00	3.1E+01	NA	7.7E+00
Beryllium														
Inhalation	NA	NA	NA	8.4E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	2.4E-06				
Ingestion	NA	5.0E-03	5.0E-03	4.3E+00	5.7E-05	1.1E-02	9.1E-05	1.8E-02	9.7E-06	4.2E-05				
Dermal	1.0E-03	2.5E-05	2.5E-05	8.6E+02	2.3E-04	9.2E-03	2.7E-04	1.1E-02	9.2E-05	7.9E-05				
Sum						2.1E-02		2.9E-02		1.2E-04	4.9E+00	3.4E+00	8.1E-03	8.1E-03
Cadmium														
Inhalation	NA	NA	NA	6.1E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	1.8E-06				
Ingestion	NA	1.0E-03	NA	NA	5.7E-05	5.7E-02	9.1E-05	NA	9.7E-06	0.0E+00				
Dermal	1.0E-02	2.5E-05	NA	NA	2.3E-04	9.2E-02	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.5E-01		NA		1.8E-06	6.7E-01	NA	5.7E-01	5.7E-01
Chromium VI														
Inhalation	NA	NA	1.1E-06	4.2E+01	1.7E-01	NA	2.7E-01	2.5E+00	2.9E-02	1.2E-05				
Ingestion	NA	5.0E-03	2.0E-02	NA	5.7E-05	1.1E-02	9.1E-05	4.6E-03	9.7E-06	0.0E+00				
Dermal	1.0E-03	2.5E-04	1.0E-03	NA	2.3E-04	9.2E-04	2.7E-04	2.7E-04	9.2E-05	0.0E+00				
Sum						1.2E-02		2.5E+00		1.2E-05	8.1E+00	4.1E-02	8.2E-02	4.1E-02
Lead and compounds														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	NA	NA	NA	5.7E-05	NA	9.1E-05	NA	9.7E-06	0.0E+00				
Dermal	6.0E-03	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						NA		NA		0.0E+00	NA	NA	NA	NA

Note: Re-suspension Factor (RF) = 1 E-05

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Mercury, inorganic														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	5.7E-05	1.9E-01	9.1E-05	3.0E-01	9.7E-06	0.0E+00				
Dermal	1.0E-03	6.0E-06	6.0E-06	NA	2.3E-04	3.8E-02	2.7E-04	4.5E-02	9.2E-05	0.0E+00				
Sum						2.3E-01		3.5E-01		0.0E+00	4.4E-01	2.9E-01	NA	2.9E-01
Nickel														
Inhalation	NA	NA	NA	8.4E-01	1.7E-01	NA	2.7E-01	NA	2.9E-02	2.4E-07				
Ingestion	NA	2.0E-02	2.0E-02	NA	5.7E-05	2.9E-03	9.1E-05	4.6E-03	9.7E-06	0.0E+00				
Dermal	NA	1.0E-03	1.0E-03	NA	2.3E-04	0.0E+00	2.7E-04	0.0E+00	9.2E-05	0.0E+00				
Sum						2.9E-03		4.6E-03		2.4E-07	3.5E+01	2.2E+01	4.1E+00	4.1E+00
Silver														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	5.0E-03	5.0E-03	NA	5.7E-05	1.1E-02	9.1E-05	1.8E-02	9.7E-06	0.0E+00				
Dermal	1.0E-02	2.5E-04	2.5E-04	NA	2.3E-04	9.2E-03	2.7E-04	1.1E-02	9.2E-05	0.0E+00				
Sum						2.1E-02		2.9E-02		0.0E+00	4.9E+00	3.4E+00	NA	3.4E+00
Vanadium														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	7.0E-03	7.0E-03	NA	5.7E-05	8.1E-03	9.1E-05	1.3E-02	9.7E-06	0.0E+00				
Dermal	1.0E-03	7.0E-05	7.0E-05	NA	2.3E-04	3.3E-03	2.7E-04	3.9E-03	9.2E-05	0.0E+00				
Sum						1.1E-02		1.7E-02		0.0E+00	8.8E+00	5.9E+00	NA	5.9E+00
Cyanide (free)														
Inhalation	NA	2.0E-03	2.9E-04	NA	1.7E-01	8.5E-04	2.7E-01	9.3E-03	2.9E-02	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	5.7E-05	2.9E-03	9.1E-05	4.6E-03	9.7E-06	0.0E+00				
Dermal	3.0E-02	2.0E-02	2.0E-02	NA	2.3E-04	3.5E-04	2.7E-04	4.1E-04	9.2E-05	0.0E+00				
Sum						4.0E-03		1.4E-02		0.0E+00	2.5E+01	7.0E+00	NA	7.0E+00
Nitrate/nitrite														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	1.0E-01	1.0E-01	NA	5.7E-05	5.7E-04	9.1E-05	9.1E-04	9.7E-06	0.0E+00				
Dermal	1.0E-03	1.0E-01	1.0E-01	NA	2.3E-04	2.3E-06	2.7E-04	2.7E-06	9.2E-05	0.0E+00				
Sum						5.7E-04		9.1E-04		0.0E+00	1.7E+02	1.1E+02	NA	1.1E+02
Acenaphthene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	6.0E-02	6.0E-01	NA	5.7E-05	9.5E-04	9.1E-05	1.5E-04	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						9.5E-04		1.5E-04		0.0E+00	1.1E+02	6.6E+02	NA	1.1E+02

Note: Re-suspension Factor (RF) = 1 E-05

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Acenaphthylene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		0.0E+00	7.0E+01	4.4E+01	NA	4.4E+01
Anthracene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	3.0E-01	3.0E+00	NA	5.7E-05	1.9E-04	9.1E-05	3.0E-05	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.9E-04		3.0E-05		0.0E+00	5.3E+02	3.3E+03	NA	5.3E+02
Benzo(a) Anthracene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	7.1E-05				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		7.1E-05	7.0E+01	4.4E+01	1.4E-02	1.4E-02
Benzo(a)pyrene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	7.1E-05				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		7.1E-05	7.0E+01	4.4E+01	1.4E-02	1.4E-02
Benzo(b)Fluoranthene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	7.1E-05				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		7.1E-05	7.0E+01	4.4E+01	1.4E-02	1.4E-02
Benzo(g,h,i)perylene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		0.0E+00	7.0E+01	4.4E+01	NA	4.4E+01
Benzo(k)fluoranthene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	7.1E-05				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		7.1E-05	7.0E+01	4.4E+01	1.4E-02	1.4E-02

Note: Re-suspension Factor (RF) = 1 E-05

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Chrysene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	7.1E-05				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		7.1E-05	7.0E+01	4.4E+01	1.4E-02	1.4E-02
Dibenzo(a,h)Anthracene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	7.1E-05				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		7.1E-05	7.0E+01	4.4E+01	1.4E-02	1.4E-02
Fluoranthene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		0.0E+00	7.0E+01	4.4E+01	NA	4.4E+01
Fluorene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-01	NA	5.7E-05	1.4E-03	9.1E-05	2.3E-04	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-04		0.0E+00	7.0E+01	4.4E+02	NA	7.0E+01
Methylnaphthalene, 2-														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		0.0E+00	7.0E+01	4.4E+01	NA	4.4E+01
Naphthalene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	5.7E-05	1.4E-03	9.1E-05	2.3E-03	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.4E-03		2.3E-03		0.0E+00	7.0E+01	4.4E+01	NA	4.4E+01
Phenanthrene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	5.7E-05	1.9E-03	9.1E-05	3.0E-04	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.9E-03		3.0E-04		0.0E+00	5.3E+01	3.3E+02	NA	5.3E+01

Note: Re-suspension Factor (RF) = 1 E-05

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Pyrene														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	5.7E-05	1.9E-03	9.1E-05	3.0E-04	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						1.9E-03		3.0E-04		0.0E+00	5.3E+01	3.3E+02	NA	5.3E+01
Bis(2-ethylhexyl)phthalate														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	1.4E-02	5.7E-05	2.9E-03	9.1E-05	4.6E-03	9.7E-06	1.4E-07				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	2.3E-04	0.0E+00	2.7E-04	0.0E+00	9.2E-05	0.0E+00				
Sum						2.9E-03		4.6E-03		1.4E-07	3.5E+01	2.2E+01	7.4E+00	7.4E+00
Butylbenzyl phthalate														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	2.0E-01	2.0E+00	NA	5.7E-05	2.9E-04	9.1E-05	4.6E-05	9.7E-06	0.0E+00				
Dermal	NA	2.0E-01	2.0E+00	NA	2.3E-04	0.0E+00	2.7E-04	0.0E+00	9.2E-05	0.0E+00				
Sum						2.9E-04		4.6E-05		0.0E+00	3.5E+02	2.2E+03	NA	3.5E+02
Di-n-butyl phthalate														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	1.0E-01	1.0E+00	NA	5.7E-05	5.7E-04	9.1E-05	9.1E-05	9.7E-06	0.0E+00				
Dermal	NA	NA	NA	NA	2.3E-04	NA	2.7E-04	NA	9.2E-05	0.0E+00				
Sum						5.7E-04		9.1E-05		0.0E+00	1.8E+02	1.1E+03	NA	1.8E+02
Di-n-octyl phthalate														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	5.7E-05	2.9E-03	9.1E-05	4.6E-03	9.7E-06	0.0E+00				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	2.3E-04	0.0E+00	2.7E-04	0.0E+00	9.2E-05	0.0E+00				
Sum						2.9E-03		4.6E-03		0.0E+00	3.5E+01	2.2E+01	NA	2.2E+01
Aldrin														
Inhalation	NA	NA	NA	1.7E+01	1.7E-01	NA	2.7E-01	NA	2.9E-02	4.9E-06				
Ingestion	NA	3.0E-05	3.0E-05	1.7E+01	5.7E-05	1.9E+00	9.1E-05	3.0E+00	9.7E-06	1.6E-04				
Dermal	1.0E-02	3.0E-05	3.0E-05	1.7E+01	2.3E-04	7.7E-02	2.7E-04	9.0E-02	9.2E-05	1.6E-05				
Sum						2.0E+00		3.1E+00		1.9E-04	5.1E-02	3.2E-02	5.4E-03	5.4E-03
Alpha-Endosulfan														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	5.7E-05	1.1E+00	9.1E-05	4.6E-01	9.7E-06	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	2.3E-04	4.6E-02	2.7E-04	1.4E-02	9.2E-05	0.0E+00				
Sum						1.2E+00		4.7E-01		0.0E+00	8.4E-02	2.1E-01	NA	8.4E-02

Note: Re-suspension Factor (RF) = 1 E-05

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Beta-Endosulfan														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	5.7E-05	1.1E+00	9.1E-05	4.6E-01	9.7E-06	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	2.3E-04	4.6E-02	2.7E-04	1.4E-02	9.2E-05	0.0E+00				
Sum						1.2E+00		4.7E-01		0.0E+00	8.4E-02	2.1E-01	NA	8.4E-02
DDD, 4,4'-														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	NA	NA	2.4E-01	5.7E-05	NA	9.1E-05	NA	9.7E-06	2.3E-06				
Dermal	1.0E-02	NA	NA	2.4E-01	2.3E-04	NA	2.7E-04	NA	9.2E-05	2.2E-07				
Sum						NA		NA		2.5E-06	NA	NA	3.9E-01	3.9E-01
DDE, 4,4'-														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	NA	NA	3.4E-01	5.7E-05	NA	9.1E-05	NA	9.7E-06	3.3E-06				
Dermal	1.0E-02	NA	NA	3.4E-01	2.3E-04	NA	2.7E-04	NA	9.2E-05	3.1E-07				
Sum						NA		NA		3.6E-06	NA	NA	2.8E-01	2.8E-01
DDT, 4,4'-														
Inhalation	NA	NA	NA	3.4E-01	1.7E-01	NA	2.7E-01	NA	2.9E-02	9.9E-08				
Ingestion	NA	5.0E-04	5.0E-04	3.4E-01	5.7E-05	1.1E-01	9.1E-05	1.8E-01	9.7E-06	3.3E-06				
Dermal	1.0E-02	5.0E-04	5.0E-04	3.4E-01	2.3E-04	4.6E-03	2.7E-04	5.4E-03	9.2E-05	3.1E-07				
Sum						1.2E-01		1.9E-01		3.7E-06	8.4E-01	5.3E-01	2.7E-01	2.7E-01
Dieldrin														
Inhalation	NA	NA	NA	1.6E+01	1.7E-01	NA	2.7E-01	NA	2.9E-02	4.6E-06				
Ingestion	NA	5.0E-05	5.0E-05	1.6E+01	5.7E-05	1.1E+00	9.1E-05	1.8E+00	9.7E-06	1.6E-04				
Dermal	1.0E-02	5.0E-05	5.0E-05	1.6E+01	2.3E-04	4.6E-02	2.7E-04	5.4E-02	9.2E-05	1.5E-05				
Sum						1.2E+00		1.9E+00		1.7E-04	8.4E-02	5.3E-02	5.7E-03	5.7E-03
Endrin														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	5.7E-05	1.9E-01	9.1E-05	3.0E-01	9.7E-06	0.0E+00				
Dermal	1.0E-02	3.0E-04	3.0E-04	NA	2.3E-04	7.7E-03	2.7E-04	9.0E-03	9.2E-05	0.0E+00				
Sum						2.0E-01		3.1E-01		0.0E+00	5.1E-01	3.2E-01	NA	3.2E-01
Gamma BHC (Lindane)														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-03	1.3E+00	5.7E-05	1.9E-01	9.1E-05	3.0E-02	9.7E-06	1.3E-05				
Dermal	1.0E-02	3.0E-04	3.0E-03	1.3E+00	2.3E-04	7.7E-03	2.7E-04	9.0E-04	9.2E-05	1.2E-06				
Sum						2.0E-01		3.1E-02		1.4E-05	5.1E-01	3.2E+00	7.2E-02	7.2E-02

Note: Re-suspension Factor (RF) = 1 E-05

Table A-3
Calculation of Levels of No Significant Risk for Residential Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Heptachlor														
Inhalation	NA	NA	NA	4.5E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	1.3E-06				
Ingestion	NA	5.0E-04	5.0E-04	4.5E+00	5.7E-05	1.1E-01	9.1E-05	1.8E-01	9.7E-06	4.4E-05				
Dermal	1.0E-02	5.0E-04	5.0E-04	4.5E+00	2.3E-04	4.6E-03	2.7E-04	5.4E-03	9.2E-05	4.1E-06				
Sum						1.2E-01		1.9E-01		4.9E-05	8.4E-01	5.3E-01	2.0E-02	2.0E-02
Heptachlor Epoxide														
Inhalation	NA	NA	NA	9.1E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	2.6E-06				
Ingestion	NA	1.3E-05	1.3E-05	9.1E+00	5.7E-05	4.4E+00	9.1E-05	7.0E+00	9.7E-06	8.8E-05				
Dermal	1.0E-02	1.3E-05	1.3E-05	9.1E+00	2.3E-04	1.8E-01	2.7E-04	2.1E-01	9.2E-05	8.4E-06				
Sum						4.6E+00		7.2E+00		9.9E-05	2.2E-02	1.4E-02	1.0E-02	1.0E-02
Methoxychlor														
Inhalation	NA	NA	NA	9.1E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	2.6E-06				
Ingestion	NA	5.0E-03	5.0E-03	9.1E+00	5.7E-05	1.1E-02	9.1E-05	1.8E-02	9.7E-06	8.8E-05				
Dermal	NA	5.0E-03	5.0E-03	9.1E+00	2.3E-04	0.0E+00	2.7E-04	0.0E+00	9.2E-05	0.0E+00				
Sum						1.1E-02		1.8E-02		9.1E-05	8.8E+00	5.5E+00	1.1E-02	1.1E-02
PCB 1254														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	5.7E-05	8.1E-01	9.1E-05	1.3E+00	9.7E-06	7.5E-05				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	2.3E-04	2.1E-01	2.7E-04	2.4E-01	9.2E-05	4.5E-05				
Sum						1.0E+00		1.5E+00		1.2E-04	9.8E-02	6.5E-02	8.4E-03	8.4E-03
PCB 1260														
Inhalation	NA	NA	NA	NA	1.7E-01	NA	2.7E-01	NA	2.9E-02	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	5.7E-05	8.1E-01	9.1E-05	1.3E+00	9.7E-06	7.5E-05				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	2.3E-04	2.1E-01	2.7E-04	2.4E-01	9.2E-05	4.5E-05				
Sum						1.0E+00		1.5E+00		1.2E-04	9.8E-02	6.5E-02	8.4E-03	8.4E-03
Dinitrotoluene														
Inhalation	NA	NA	NA	9.1E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	2.6E-06				
Ingestion	NA	2.0E-03	2.0E-03	6.8E-02	5.7E-05	2.9E-02	9.1E-05	4.6E-02	9.7E-06	6.6E-07				
Dermal	1.0E-02	2.0E-03	2.0E-03	6.8E-02	2.3E-04	1.2E-03	2.7E-04	1.4E-03	9.2E-05	6.3E-08				
Sum						3.0E-02		4.7E-02		3.4E-06	3.4E+00	2.1E+00	3.0E-01	3.0E-01
RDX														
Inhalation	NA	NA	NA	9.1E+00	1.7E-01	NA	2.7E-01	NA	2.9E-02	2.6E-06				
Ingestion	NA	3.0E-03	3.0E-03	1.1E-01	5.7E-05	1.9E-02	9.1E-05	3.0E-02	9.7E-06	1.1E-06				
Dermal	1.0E-02	3.0E-03	3.0E-03	1.1E-01	2.3E-04	7.7E-04	2.7E-04	9.0E-04	9.2E-05	1.0E-07				
Sum						2.0E-02		3.1E-02		3.8E-06	5.1E+00	3.2E+00	2.6E-01	2.6E-01

Note: Re-suspension Factor (RF) = 1 E-05

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Antimony														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-04	4.0E-04	NA	9.8E-07	2.5E-03	9.8E-07	2.5E-03	1.4E-08	0.0E+00				
Dermal	1.0E-03	4.0E-05	4.0E-05	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.5E-03		2.5E-03		0.0E+00	4.1E+01	4.1E+01	NA	4.1E+01
Arsenic														
Inhalation	NA	NA	NA	1.5E+01	3.9E-02	NA	3.9E-02	NA	5.6E-05	8.4E-08				
Ingestion	NA	3.0E-04	3.0E-04	1.8E+00	9.8E-07	3.3E-03	9.8E-07	3.3E-03	1.4E-08	2.5E-08				
Dermal	1.0E-03	2.9E-04	2.9E-04	1.8E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-03		1.1E-07	3.1E+01	3.1E+01	9.2E+00	9.2E+00
Barium														
Inhalation	NA	1.4E-04	1.4E-03	NA	3.9E-02	2.8E-02	3.9E-02	2.8E-03	5.6E-05	0.0E+00				
Ingestion	NA	7.0E-02	7.0E-02	NA	9.8E-07	1.4E-05	9.8E-07	1.4E-05	1.4E-08	0.0E+00				
Dermal	1.0E-03	7.0E-03	7.0E-03	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.8E-02		2.8E-03		0.0E+00	3.6E+00	3.6E+01	NA	3.6E+00
Beryllium														
Inhalation	NA	NA	NA	8.4E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	4.7E-08				
Ingestion	NA	5.0E-03	5.0E-03	4.3E+00	9.8E-07	2.0E-04	9.8E-07	2.0E-04	1.4E-08	6.0E-08				
Dermal	1.0E-03	2.5E-05	2.5E-05	8.6E+02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		2.0E-04		1.1E-07	5.1E+02	5.1E+02	9.3E+00	9.3E+00
Cadmium														
Inhalation	NA	NA	NA	6.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	3.4E-08				
Ingestion	NA	1.0E-03	NA	NA	9.8E-07	9.8E-04	9.8E-07	NA	1.4E-08	0.0E+00				
Dermal	1.0E-02	2.5E-05	NA	NA	NA	0.0E+00	NA	NA	NA	0.0E+00				
Sum						9.8E-04		NA		3.4E-08	1.0E+02	NA	2.9E+01	2.9E+01
Chromium VI														
Inhalation	NA	NA	1.1E-06	4.2E+01	3.9E-02	NA	3.9E-02	3.5E-01	5.6E-05	2.4E-07				
Ingestion	NA	5.0E-03	2.0E-02	NA	9.8E-07	2.0E-04	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	1.0E-03	2.5E-04	1.0E-03	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		3.5E-01		2.4E-07	5.1E+02	2.8E-01	4.3E+00	2.8E-01
Lead and compounds														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	NA	NA	NA	9.8E-07	NA	9.8E-07	NA	1.4E-08	0.0E+00				
Dermal	6.0E-03	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						NA		NA		0.0E+00	NA	NA	NA	NA

Note: Re-suspension Factor (RF) = 1 E-04

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (I)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (I)	Factor (I)				
Mercury, inorganic														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	9.8E-07	3.3E-03	9.8E-07	3.3E-03	1.4E-08	0.0E+00				
Dermal	1.0E-03	6.0E-06	6.0E-06	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-03		0.0E+00	3.1E+01	3.1E+01	NA	3.1E+01
Nickel														
Inhalation	NA	NA	NA	8.4E-01	3.9E-02	NA	3.9E-02	NA	5.6E-05	4.7E-09				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	NA	1.0E-03	1.0E-03	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-05		4.9E-05		4.7E-09	2.0E+03	2.0E+03	2.1E+02	2.1E+02
Silver														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	5.0E-03	5.0E-03	NA	9.8E-07	2.0E-04	9.8E-07	2.0E-04	1.4E-08	0.0E+00				
Dermal	1.0E-02	2.5E-04	2.5E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		2.0E-04		0.0E+00	5.1E+02	5.1E+02	NA	5.1E+02
Vanadium														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	7.0E-03	7.0E-03	NA	9.8E-07	1.4E-04	9.8E-07	1.4E-04	1.4E-08	0.0E+00				
Dermal	1.0E-03	7.0E-05	7.0E-05	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						1.4E-04		1.4E-04		0.0E+00	7.1E+02	7.1E+02	NA	7.1E+02
Cyanide (free)														
Inhalation	NA	2.0E-03	2.9E-04	NA	3.9E-02	2.0E-04	3.9E-02	1.3E-03	5.6E-05	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	3.0E-02	2.0E-02	2.0E-02	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.4E-04		1.4E-03		0.0E+00	4.1E+02	7.2E+01	NA	7.2E+01
Nitrate/nitrite														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	1.0E-01	1.0E-01	NA	9.8E-07	9.8E-06	9.8E-07	9.8E-06	1.4E-08	0.0E+00				
Dermal	1.0E-03	1.0E-01	1.0E-01	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						9.8E-06		9.8E-06		0.0E+00	1.0E+04	1.0E+04	NA	1.0E+04
Acenaphthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	6.0E-02	6.0E-01	NA	9.8E-07	1.6E-05	9.8E-07	1.6E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						1.6E-05		1.6E-06		0.0E+00	6.1E+03	6.1E+04	NA	6.1E+03

Note: Re-suspension Factor (RF) = 1 E-04

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Acenaphthylene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Anthracene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	3.0E-01	3.0E+00	NA	9.8E-07	3.3E-06	9.8E-07	3.3E-07	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						3.3E-06		3.3E-07		0.0E+00	3.1E+04	3.1E+05	NA	3.1E+04
Benzo(a) Anthracene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Benzo(a)pyrene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Benzo(b)Fluoranthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Benzo(g,h,i)perylene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Benzo(k)fluoranthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00

Note: Re-suspension Factor (RF) = 1 E-04

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Chrysene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Dibenzo(a,h)Anthracene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	7.3E+00	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	1.0E-07				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		1.0E-07	4.1E+03	4.1E+03	9.8E+00	9.8E+00
Fluoranthene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Fluorene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-01	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-06		0.0E+00	4.1E+03	4.1E+04	NA	4.1E+03
Methylnaphthalene, 2-														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Naphthalene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	4.0E-02	4.0E-02	NA	9.8E-07	2.5E-05	9.8E-07	2.5E-05	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						2.5E-05		2.5E-05		0.0E+00	4.1E+03	4.1E+03	NA	4.1E+03
Phenanthrene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	9.8E-07	3.3E-05	9.8E-07	3.3E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						3.3E-05		3.3E-06		0.0E+00	3.1E+03	3.1E+04	NA	3.1E+03

Note: Re-suspension Factor (RF) = 1 E-04

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Pyrene														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	3.0E-02	3.0E-01	NA	9.8E-07	3.3E-05	9.8E-07	3.3E-06	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						3.3E-05		3.3E-06		0.0E+00	3.1E+03	3.1E+04	NA	3.1E+03
Bis(2-ethylhexyl)phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	1.4E-02	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	2.0E-10				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-05		4.9E-05		2.0E-10	2.0E+03	2.0E+03	5.1E+03	2.0E+03
Butylbenzyl phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	2.0E-01	2.0E+00	NA	9.8E-07	4.9E-06	9.8E-07	4.9E-07	1.4E-08	0.0E+00				
Dermal	NA	2.0E-01	2.0E+00	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-06		4.9E-07		0.0E+00	2.0E+04	2.0E+05	NA	2.0E+04
Di-n-butyl phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	1.0E-01	1.0E+00	NA	9.8E-07	9.8E-06	9.8E-07	9.8E-07	1.4E-08	0.0E+00				
Dermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0E+00				
Sum						9.8E-06		9.8E-07		0.0E+00	1.0E+04	1.0E+05	NA	1.0E+04
Di-n-octyl phthalate														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	2.0E-02	2.0E-02	NA	9.8E-07	4.9E-05	9.8E-07	4.9E-05	1.4E-08	0.0E+00				
Dermal	NA	2.0E-02	2.0E-02	1.4E-02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-05		4.9E-05		0.0E+00	2.0E+03	2.0E+03	NA	2.0E+03
Aldrin														
Inhalation	NA	NA	NA	1.7E+01	3.9E-02	NA	3.9E-02	NA	5.6E-05	9.5E-08				
Ingestion	NA	3.0E-05	3.0E-05	1.7E+01	9.8E-07	3.3E-02	9.8E-07	3.3E-02	1.4E-08	2.4E-07				
Dermal	1.0E-02	3.0E-05	3.0E-05	1.7E+01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-02		3.3E-02		3.3E-07	3.1E+00	3.1E+00	3.0E+00	3.0E+00
Alpha-Endosulfan														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	9.8E-07	2.0E-02	9.8E-07	4.9E-03	1.4E-08	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-02		4.9E-03		0.0E+00	5.1E+00	2.0E+01	NA	5.1E+00

Note: Re-suspension Factor (RF) = 1 E-04

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario
(continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Beta-Endosulfan														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	5.0E-05	2.0E-04	NA	9.8E-07	2.0E-02	9.8E-07	4.9E-03	1.4E-08	0.0E+00				
Dermal	1.0E-02	5.0E-05	2.0E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-02		4.9E-03		0.0E+00	5.1E+00	2.0E+01	NA	5.1E+00
DDD, 4,4'-														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	NA	NA	2.4E-01	9.8E-07	NA	9.8E-07	NA	1.4E-08	3.4E-09				
Dermal	1.0E-02	NA	NA	2.4E-01	NA	NA	NA	NA	NA	0.0E+00				
Sum						NA		NA		3.4E-09	NA	NA	3.0E+02	3.0E+02
DDE, 4,4'-														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	NA	NA	3.4E-01	9.8E-07	NA	9.8E-07	NA	1.4E-08	4.8E-09				
Dermal	1.0E-02	NA	NA	3.4E-01	NA	NA	NA	NA	NA	0.0E+00				
Sum						NA		NA		4.8E-09	NA	NA	2.1E+02	2.1E+02
DDT, 4,4'-														
Inhalation	NA	NA	NA	3.4E-01	3.9E-02	NA	3.9E-02	NA	5.6E-05	1.9E-09				
Ingestion	NA	5.0E-04	5.0E-04	3.4E-01	9.8E-07	2.0E-03	9.8E-07	2.0E-03	1.4E-08	4.8E-09				
Dermal	1.0E-02	5.0E-04	5.0E-04	3.4E-01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-03		2.0E-03		6.7E-09	5.1E+01	5.1E+01	1.5E+02	5.1E+01
Dieldrin														
Inhalation	NA	NA	NA	1.6E+01	3.9E-02	NA	3.9E-02	NA	5.6E-05	9.0E-08				
Ingestion	NA	5.0E-05	5.0E-05	1.6E+01	9.8E-07	2.0E-02	9.8E-07	2.0E-02	1.4E-08	2.2E-07				
Dermal	1.0E-02	5.0E-05	5.0E-05	1.6E+01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-02		2.0E-02		3.1E-07	5.1E+00	5.1E+00	3.2E+00	3.2E+00
Endrin														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-04	NA	9.8E-07	3.3E-03	9.8E-07	3.3E-03	1.4E-08	0.0E+00				
Dermal	1.0E-02	3.0E-04	3.0E-04	NA	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-03		0.0E+00	3.1E+01	3.1E+01	NA	3.1E+01
Gamma BHC (Lindane)														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	3.0E-04	3.0E-03	1.3E+00	9.8E-07	3.3E-03	9.8E-07	3.3E-04	1.4E-08	1.8E-08				
Dermal	1.0E-02	3.0E-04	3.0E-03	1.3E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-03		3.3E-04		1.8E-08	3.1E+01	3.1E+02	5.5E+01	3.1E+01

Note: Re-suspension Factor (RF) = 1 E-04

Table A-4
Calculation of Levels of No Significant Risk for Residential Renovation Worker Scenario (continued)

Chemical/Route	Critical Toxicity Values				Factors						Risk Based Concentration			Calculated Levels of no Significant Risk (mg/m^2)
					Chronic		Subchronic		Lifetime		Chronic	Subchronic	Lifetime	
	ABS	RfD (c)	RfD (s)	SF (l)	HIF (c)	Factor (c)	HIF (s)	Factor (s)	HIF (l)	Factor (l)				
Heptachlor														
Inhalation	NA	NA	NA	4.5E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	2.5E-08				
Ingestion	NA	5.0E-04	5.0E-04	4.5E+00	9.8E-07	2.0E-03	9.8E-07	2.0E-03	1.4E-08	6.3E-08				
Dermal	1.0E-02	5.0E-04	5.0E-04	4.5E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-03		2.0E-03		8.8E-08	5.1E+01	5.1E+01	1.1E+01	1.1E+01
Heptachlor Epoxide														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	5.1E-08				
Ingestion	NA	1.3E-05	1.3E-05	9.1E+00	9.8E-07	7.5E-02	9.8E-07	7.5E-02	1.4E-08	1.3E-07				
Dermal	1.0E-02	1.3E-05	1.3E-05	9.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						7.5E-02		7.5E-02		1.8E-07	1.3E+00	1.3E+00	5.6E+00	1.3E+00
Methoxychlor														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	5.1E-08				
Ingestion	NA	5.0E-03	5.0E-03	9.1E+00	9.8E-07	2.0E-04	9.8E-07	2.0E-04	1.4E-08	1.3E-07				
Dermal	NA	5.0E-03	5.0E-03	9.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						2.0E-04		2.0E-04		1.8E-07	5.1E+02	5.1E+02	5.6E+00	5.6E+00
PCB 1254														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	9.8E-07	1.4E-02	9.8E-07	1.4E-02	1.4E-08	1.1E-07				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						1.4E-02		1.4E-02		1.1E-07	7.1E+00	7.1E+00	9.3E+00	7.1E+00
PCB 1260														
Inhalation	NA	NA	NA	NA	3.9E-02	NA	3.9E-02	NA	5.6E-05	0.0E+00				
Ingestion	NA	7.0E-05	7.0E-05	7.7E+00	9.8E-07	1.4E-02	9.8E-07	1.4E-02	1.4E-08	1.1E-07				
Dermal	6.0E-02	6.7E-05	6.7E-05	8.1E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						1.4E-02		1.4E-02		1.1E-07	7.1E+00	7.1E+00	9.3E+00	7.1E+00
Dinitrotoluene														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	5.1E-08				
Ingestion	NA	2.0E-03	2.0E-03	6.8E-02	9.8E-07	4.9E-04	9.8E-07	4.9E-04	1.4E-08	9.5E-10				
Dermal	1.0E-02	2.0E-03	2.0E-03	6.8E-02	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						4.9E-04		4.9E-04		5.2E-08	2.0E+02	2.0E+02	1.9E+01	1.9E+01
RDX														
Inhalation	NA	NA	NA	9.1E+00	3.9E-02	NA	3.9E-02	NA	5.6E-05	5.1E-08				
Ingestion	NA	3.0E-03	3.0E-03	1.1E-01	9.8E-07	3.3E-04	9.8E-07	3.3E-04	1.4E-08	1.5E-09				
Dermal	1.0E-02	3.0E-03	3.0E-03	1.1E-01	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00				
Sum						3.3E-04		3.3E-04		5.3E-08	3.1E+02	3.1E+02	1.9E+01	1.9E+01

Note: Re-suspension Factor (RF) = 1 E-04

Table A-5
MTL Off-site Commercial Background Wipe Sample Results

Units = mg/m^2	BKWP01	BKWP01B	BKWP02	BKWP03	BKWP04	BKWP05		BKWP05B		BKWP06	BKWP07	BKWP07B	BKWP08		Maximum	
		(duplicate)						(duplicate)				(duplicate)			Detection	
COMPOUND	result	result	result	result	result	result	qualifier	result	qualifier	result	result	result	result	qualifier		
Aluminum	2.25	3.06	10.2	72.7	196	2.79		2.38		2.85	63.2	5.65	25		196	
Barium	1.82		2.32	0.542	2.05								18.9		18.9	
beta-Endosulfan		0.00189													0.00189	
bis (2-Ethylhexyl) Phthalate	1.5		7.6			9.9	GT	9.9	GT	0.92			9.9	GT	9.9	GT
Butylbenzyl Phthalate	3.6		1.2												3.6	
Calcium	23.3	19.4	54.2	815	1800	45		30.7		52	372	32.2	58.7		1800	
Chromium			0.197	0.873	0.928								0.218		0.928	
Copper			0.654	0.451	2.27	0.35		0.33			0.325	0.337	0.71		2.27	
DDT						0.01									0.01	
Dieldrin			0.00459			0.01		0.01							0.01	
Endosulfan Sulfate					0.0147	0.48		0.44		0.00435					0.48	
Endrin Ketone		0.0139		0.00282	0.00341					0.00422					0.0139	
Iron	4.82	1.91	63.5	151	409	5.92		2.68		3.74	4.06	3.16	44.8		409	
Lead			2.98		1.7								0.789		2.98	
Magnesium	4.95	4.35	11.5	105	352	7.99		4.98		5.88	7.16	6.27	14.5		352	
Manganese				2.69	8.52										8.52	
Mercury										0.01	0.0064	0.00848			0.01	
Nickel				0.376	0.557										0.557	
Nitrite/Nitrate		0.353		0.204	2.14								0.498		2.14	
Potassium				19.1	60.8	47.5		14.5							60.8	
Sodium	15.2	14.8	36.7	14.9	61.8	51.7		29.5		12.5	155	11.9	22.3		155	
Vanadium				0.23	0.682										0.682	
Zinc	1.67	0.687	4.15	3.23	7.17	0.85		0.69		0.74	1.2	1.16	6.73		7.17	

Note : Only detected compounds are presented
GT - Greater Than
See Table A-16 for location of wipe samples

Table A-6
MTL Onsite Residential Background Wipe Sample Results

Units = mg/m^2	111WP01	111WP01B	111WP02	111WP03	118WP01		118WP02	
COMPOUND	result	result	result	result	result	qual	result	qual
Aluminum	3.48		4.67	66.4	2.83		2.92	
Arsenic				0.265				
Barium				16.3			1.11	
Benzyl Alcohol								
beta-Endosulfan								
bis (2-Ethylhexyl) Phthalate				0.9			9.9	GT
Butylbenzyl Phthalate					9.9	GT	3.1	
Cadmium				0.0712				
Calcium	35.6		35.1	217	24.6		24.7	
Chromium	0.0794		0.0425	0.511	0.139		0.134	
Cobalt	0.306							
Copper	0.305		0.125	16.1				
DDD								
DDE				0.00586				
DDT	0.0151	0.0157		0.0562	0.00771			
Dieldrin				0.00674				
Di-n-Octyl Phthalate					9.9	GT		
Endrin							0.0534	
Endrin Ketone								
Fluoranthene								
Heptachlor Epoxide								
Iron	5.1		2.08	183	5.01		7.49	
Isodrin								
Lead	0.66			335				
Lindane								
Magnesium	6.48		5.03	47.8	5.51		4.7	
Manganese				2.6				
Mercury	0.00653		0.00731	0.067			0.0169	
Nickel				0.486				
Nitrite/Nitrate			1.57	1.33	0.287		0.353	
Phenanthrene								
Potassium				28.6				
Sodium	18		8.41	25.9	19		24.5	
Vanadium				1.05				
Zinc	0.646		18.3	32.5	1.53		2.81	

Note : Only detected compounds are presented
GT - Greater Than
See Table A-15 for location of wipe samples

Table A-6
MTL Onsite Residential Background Wipe Sample Results
(continued)

Units = mg/m^2	111WP04	111WP05	117WP01	117WP02		117WP02B		118WP03	118WP04	Maximum Detection	
COMPOUND	result	result	result	result	qual	result	qual	result	result	result	qual
Aluminum	8.28	149	2.48	14.6		25.7		1.23	4.35	149	
Arsenic										0.265	
Barium	0.536	8.16		0.314		0.409		0.108	0.523	16.3	
Benzyl Alcohol									0.42	0.42	
beta-Endosulfan		0.00177								0.00177	
bis (2-Ethylhexyl) Phthalate		1.3						0.46	2.7	9.9	GT
Butylbenzyl Phthalate										9.9	GT
Cadmium		0.979		0.0635						0.979	
Calcium	370	1250	38.6	86.1		108		23.5	52.8	1250	
Chromium	0.0416	1.02	0.0366	0.139		0.23		0.0312	0.0832	1.02	
Cobalt		0.164								0.306	
Copper	0.209	10.4	0.533	0.725		0.717		0.0726	0.258	16.1	
DDD		0.0386								0.0386	
DDE		0.0515	0.00866	0.1	GT	0.1	GT		0.0058	0.1	GT
DDT	0.00473	0.108	0.00493	0.1	GT	0.1	GT		0.00918	0.108	
Dieldrin		0.00402		0.00401		0.00439				0.00674	
Di-n-Octyl Phthalate										9.9	GT
Endrin										0.0534	
Endrin Ketone	0.000469	0.00247								0.00247	
Fluoranthene		0.22								0.22	
Heptachlor Epoxide				0.00136		0.00146				0.00146	
Iron	19.2	756	2.53	73.3		101		2.42	11.2	756	
Isodrin		0.0041								0.0041	
Lead	1.07	102		14.4		38.9			0.473	335	
Lindane		0.00125	0.000514					0.000883	0.00124	0.00125	
Magnesium	39.9	227		9.16		11.9		3.92	7.06	227	
Manganese	0.413	9.99	4.91	0.575		0.804				9.99	
Mercury	0.00725	0.0249	0.00413	0.0307		0.0376				0.067	
Nickel		1.5				0.154				1.5	
Nitrite/Nitrate	0.525	3.09		3.93				0.0205		3.93	
Phenanthrene		0.15								0.15	
Potassium	6.08	69.2	3.84	7.69		14.7				69.2	
Sodium	16	78.9	10.2	14.9		21.2		8.85	19.3	78.9	
Vanadium	0.0675	1.52				0.128				1.52	
Zinc	1.05	38.3	0.451	1.47		1.83		1.18	2.14	38.3	

Note : Only detected compounds are presented
GT - Greater Than
See Table A-15 for location of wipe samples

Table A-7

MTL Building Interior Surface Levels of No Significant Risk (mg/m^2) Excluding Samples 111WP03 (attic) and 111WP05 (basement floor)

Chemical	Calculated Levels of No Significant Risk - Commercial (mg/m^2)	Maximum Detection in Background - Commercial (mg/m^2)	Comparison Levels for Commercial Reuse (mg/m^2)	Calculated Levels of No Significant Risk - Residential (mg/m^2)	Maximum Detection in Background - Residential (mg/m^2)	Comparison Levels for Residential Reuse (mg/m^2)
Acenaphthene	6100		6100[1]	110		110[1]
Acenaphthylene	4100		4100[1,2]	44		44[2]
Aldrin	0.077		.077[3]	0.0054		.0054[3]
Alpha-Endosulfan	2.6		2.6[1]	0.084		.084[1]
Anthracene	31000		31000[1]	530		530[1]
Antimony	21		21[1,2]	0.43		.43[2]
Arsenic	0.59		.59[3]	0.046		.046[3]
Barium	3.6	18.9	18.9[4]	3.6	1.11	3.6[1]
Benzo (a) anthracene	0.39		.39[3]	0.014		.014[3]
Benzo (a) pyrene	0.39		.39[3]	0.014		.014[3]
Benzo (b) fluoranthene	0.39		.39[3]	0.014		.014[3]
Benzo (g,h,i) perylene	4100		4100[1,2]	44		44[2]
Benzo (k) fluoranthene	0.39		.39[3]	0.014		.014[3]
Beryllium	0.031		.031[3]	0.0081		.0081[3]
Beta-Endosulfan	2.6	0.00189	2.6[1]	0.084		.084[1]
Bis (2-ethylhexyl) phthalate	200	9.9 GT	200[3]	7.4	9.9 GT	9.9[4]
Butylbenzyl phthalate	20000	3.6	20000[1]	350	9.9 GT	350[1]
Cadmium	2.4		2.4[3]	0.57	0.0635	.57[3]
Chromium	0.28	0.928	.928[4]	0.041	0.23	.23[4]
Chrysene	0.39		.39[3]	0.014		.014[3]
Cyanide (free)	72		72[2]	7		7[2]
DDD	6		6[3]	0.39		.39[3]
DDE	4.2		4.2[3]	0.28	0.1 GT	.28[3]
DDT	3.8	0.01	3.8[3]	0.27	0.1 GT	.27[3]
Di-N-butyl phthalate	10000		10000[1]	180		180[1]
Di-N-octyl phthalate	2000		2000[1,2]	22	9.9 GT	22[2]
Dibenz (a,h) anthracene	0.39		.39[3]	0.014		.014[3]

Note: Chromium is assumed to be Chromium VI for risk assessment

Table A-7
MTL Building Interior Surface Levels of No Significant Risk (mg/m^2) Excluding Samples 111WP03 (attic) and 111WP05 (basement floor) (continued)

Chemical	Calculated Levels of No Significant Risk - Commercial (mg/m^2)	Maximum Detection in Background - Commercial (mg/m^2)	Comparison Levels for Commercial Reuse (mg/m^2)	Calculated Levels of No Significant Risk - Residential (mg/m^2)	Maximum Detection in Background - Residential (mg/m^2)	Comparison Levels for Residential Reuse (mg/m^2)
Dieldrin	0.081	0.01	.081[3]	0.0057	0.00439	.0057[3]
Dinitrotoluene	1.5		1.5[3]	0.3		.3[3]
Endrin	16		16[1,2]	0.32	0.0534	.32[2]
Fluoranthene	4100		4100[1,2]	44		44[2]
Fluorene	4100		4100[1]	70		70[1]
Heptachlor	0.29		.29[3]	0.02		.02[3]
Heptachlor epoxide	0.14		.14[3]	0.01	0.00146	.01[3]
Lead and compounds	NA	2.98	2.98[4]	NA	38.9	38.9[4]
Lindane	1.1		1.1[3]	0.072	0.00124	.072[3]
Mercury, inorganic	5.3	0.01	5.3[1,2]	0.29	0.0376	.29[2]
Methoxychlor	0.26		.26[3]	0.011		.011[3]
Methylnaphthalene, 2-	4100		4100[1,2]	44		44[2]
Naphthalene	4100		4100[1,2]	44		44[2]
Nickel	18	0.557	18[3]	4.1	0.154	4.1[3]
Nitrate/Nitrite	9300	2.14	9300[1,2]	110	3.93	110[2]
PCB 1254	0.051		.051[3]	0.0084		.0084[3]
PCB 1260	0.051		.051[3]	0.0084		.0084[3]
Phenanthrene	3100		3100[1]	53		53[1]
Pyrene	3100		3100[1]	53		53[1]
RDX	1.5		1.5[3]	0.26		.26[3]
Silver	26		26[1,2]	3.4		3.4[2]
Vanadium	68	0.682	68[1,2]	5.9	0.128	5.9[2]

Basis for Comparison Level:
[1] Non-carcinogenic Chronic
[2] Non-carcinogenic Sub-Chronic
[3] Carcinogenic
[4] Background

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 36WP07	36	0.1	Chromium	5.22		Floor	Concrete
WIPE 36WP07	36	0.1	Lead	165		Floor	Concrete
WIPE 36WP07	36	0.1	PCB 1254	0.147		Floor	Concrete
WIPE 36WP07	36	0.1	PCB 1260	0.168		Floor	Concrete
WIPE 36WP07B	36	0.1	Chromium	3.31		Floor	Concrete
WIPE 36WP07B	36	0.1	Lead	64.2		Floor	Concrete
WIPE 36WP07B	36	0.1	PCB 1254	0.191		Floor	Concrete
WIPE 36WP07B	36	0.1	PCB 1260	0.157		Floor	Concrete
WIPE 36WP06	36	0.1	Chromium	5.32		Wall	Painted Brick
WIPE 36WP06	36	0.1	Lead	13.3		Wall	Painted Brick
WIPE 36WP06	36	0.1	PCB 1254	0.337		Wall	Painted Brick
WIPE 36WP06	36	0.1	PCB 1260	0.214		Wall	Painted Brick
WIPE 36WP08	36	0.2	Barium	195		Floor	Concrete
WIPE 36WP08	36	0.2	Chromium	107		Floor	Concrete
WIPE 36WP08	36	0.2	Lead	618		Floor	Concrete
WIPE 36WP08	36	0.2	PCB 1254	0.447		Floor	Concrete
WIPE 36WP08	36	0.2	PCB 1260	0.263		Floor	Concrete
WIPE 36WP09	36	0.2	Chromium	0.932		Wall	Brick
WIPE 36WP09	36	0.2	Lead	5880		Wall	Brick
WIPE 36WP05	36	0.3	Barium	18.9		Floor/Wall	Concrete Block
WIPE 36WP05	36	0.3	Chromium	3.22		Floor/Wall	Concrete Block
WIPE 36WP05	36	0.3	Lead	1600		Floor/Wall	Concrete Block
WIPE 36WP05B	36	0.3	Chromium	1.62		Floor/Wall	Concrete Block
WIPE 36WP05B	36	0.3	Lead	436		Floor/Wall	Concrete Block
WIPE 36WP05B	36	0.3	PCB 1260	0.0664		Floor/Wall	Concrete Block
WIPE 36WP10	36	0.4	Barium	184		Wall	Concrete
WIPE 36WP10	36	0.4	Chromium	2.44		Wall	Concrete
WIPE 36WP10	36	0.4	Lead	48.8		Wall	Concrete
WIPE 36WP10	36	0.4	PCB 1254	0.0515		Wall	Concrete
WIPE 36WP14	36	102	bis (2-Ethylhexyl) Phthalate	2	GT	Floor	Tile
WIPE 36WP14	36	102	Butylbenzyl Phthalate	2	GT	Floor	Tile
WIPE 36WP12	36	Cafeteria	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 37WP50	37	103	Barium	203		Floor	Concrete
WIPE 37WP50	37	103	Chromium	2.7		Floor	Concrete
WIPE 37WP50	37	103	Lead	14.2		Floor	Concrete
WIPE 37WP50	37	103	PCB 1260	0.0792		Floor	Concrete
WIPE 37WP35	37	104	Barium	20.3		Floor	Concrete
WIPE 37WP35	37	104	Chromium	0.954		Floor	Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 37WP35	37	104	Lead	4.16		Floor	Concrete
WIPE 37WP35B	37	104	Barium	24.3		Floor	Concrete
WIPE 37WP35B	37	104	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 37WP35B	37	104	Chromium	1.17		Floor	Concrete
WIPE 37WP35B	37	104	Lead	5.7		Floor	Concrete
WIPE 37WP38	37	106	Chromium	34.9		Floor	Concrete
WIPE 37WP38	37	106	Lead	27.6		Floor	Concrete
WIPE 37WP40	37	107	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 37WP40	37	107	Chromium	3.48		Floor	Concrete
WIPE 37WP40	37	107	Lead	14.1		Floor	Concrete
WIPE 37WP40	37	107	PCB 1260	0.267		Floor	Concrete
WIPE 37WP11	37	108	Chromium	9.58		Floor	Concrete
WIPE 37WP11	37	108	Lead	21.6		Floor	Concrete
WIPE 37WP11	37	108	PCB 1254	0.0633		Floor	Concrete
WIPE 37WP10	37	110	Chromium	1.19		Wall	Concrete Block
WIPE 37WP10	37	110	Lead	26.7		Wall	Concrete Block
WIPE 37WP12	37	111	Chromium	3.52		Floor	Concrete
WIPE 37WP12	37	111	DDT	0.1	GT	Floor	Concrete
WIPE 37WP12	37	111	Lead	6.75		Floor	Concrete
WIPE 37WP12	37	111	PCB 1254	0.0775		Floor	Concrete
WIPE 37WP42	37	113	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 37WP42	37	113	Chromium	1.91		Floor	Concrete
WIPE 37WP42	37	113	Lead	11.1		Floor	Concrete
WIPE 37WP14	37	115	Chromium	3.32		Floor	Concrete
WIPE 37WP14	37	115	Lead	25.7		Floor	Concrete
WIPE 37WP14	37	115	PCB 1254	0.0815		Floor	Concrete
WIPE 37WP47	37	115	Lead	8.92		Floor	Concrete
WIPE 37WP47	37	115	PCB 1260	0.0731		Floor	Concrete
WIPE 37WP44	37	116	Chromium	2.53		Floor	Concrete
WIPE 37WP44	37	116	Lead	13.6		Floor	Concrete
WIPE 37WP33	37	121	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 37WP33	37	121	Chromium	1.56		Floor	Concrete
WIPE 37WP33	37	121	Di-n-Butyl Phthalate	5	GT	Floor	Concrete
WIPE 37WP33	37	121	Lead	6.91		Floor	Concrete
WIPE 37WP31	37	127	Chromium	3.27		Floor	Tile
WIPE 37WP29	37	128	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 37WP29	37	128	Chromium	1.55		Floor	Tile
WIPE 37WP45	37	201	Di-n-Octyl Phthalate	2.5	GT	Wall	Painted Dry Wall

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 37WP37	37	113A	Arsenic	0.898		Floor	Concrete
WIPE 37WP37	37	113A	Chromium	5.57		Floor	Concrete
WIPE 37WP37	37	113A	Lead	32.1		Floor	Concrete
WIPE 37WP20	37	Auto Shop	Chromium	6.78		Floor	Concrete
WIPE 37WP20	37	Auto Shop	Lead	31		Floor	Concrete
WIPE 37WP22	37	Auto Shop	Chromium	5.25		Floor	Concrete
WIPE 37WP22	37	Auto Shop	Lead	9.32		Floor	Concrete
WIPE 37WP22B	37	Auto Shop	Chromium	3.75		Floor	Concrete
WIPE 37WP22B	37	Auto Shop	Lead	6.43		Floor	Concrete
WIPE 37WP27	37	Auto Shop	Arsenic	0.861		Floor Drain	
WIPE 37WP27	37	Auto Shop	Chromium	12.4		Floor Drain	
WIPE 37WP27	37	Auto Shop	Lead	30.9		Floor Drain	
WIPE 37WP51	37	Auto Shop	Arsenic	2.5		I-Beam	
WIPE 37WP51	37	Auto Shop	Barium	112		I-Beam	
WIPE 37WP51	37	Auto Shop	Beryllium	0.0763		I-Beam	
WIPE 37WP51	37	Auto Shop	Cadmium	3.22		I-Beam	
WIPE 37WP51	37	Auto Shop	Chromium	69.4		I-Beam	
WIPE 37WP51	37	Auto Shop	Lead	271		I-Beam	
WIPE 37WP51	37	Auto Shop	Nickel	241		I-Beam	
WIPE 37WP51	37	Auto Shop	PCB 1260	0.487		I-Beam	
WIPE 37WP52	37	Auto Shop	Arsenic	0.904		I-Beam	
WIPE 37WP52	37	Auto Shop	bis (2-Ethylhexyl) Phthalate	9.9	GT	I-Beam	
WIPE 37WP52	37	Auto Shop	Chromium	21.5		I-Beam	
WIPE 37WP52	37	Auto Shop	Lead	118		I-Beam	
WIPE 37WP52	37	Auto Shop	Nickel	50.8		I-Beam	
WIPE 37WP52	37	Auto Shop	PCB 1260	0.307		I-Beam	
WIPE 37WP19	37	Auto Shop	Lead	7.77		Wall	Brick
WIPE 37WP24	37	Bat Storage	Chromium	3.76		Floor	Concrete
WIPE 37WP24	37	Bat Storage	Lead	35.9		Floor	Concrete
WIPE 37WP23	37	Bat Storage	Chromium	1.03		Wall	Concrete Block
WIPE 37WP23	37	Bat Storage	Lead	5.78		Wall	Concrete Block
WIPE 37WP06	37	Ind Eq Shop	Chromium	1.56		Floor	Concrete
WIPE 37WP06	37	Ind Eq Shop	Lead	7.3		Floor	Concrete
WIPE 37WP06	37	Ind Eq Shop	PCB 1254	0.148		Floor	Concrete
WIPE 37WP08	37	Ind Eq Shop	Chromium	1.11		Floor	Concrete
WIPE 37WP08	37	Ind Eq Shop	Lead	5.31		Floor	Concrete
WIPE 37WP05	37	Ind Eqi Shop	Lead	5.71		Wall	Brick
WIPE 37WP03	37	Metal Shop	Chromium	4.23		Floor	Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 37WP03	37	Metal Shop	DDT	0.1	GT	Floor	Concrete
WIPE 37WP03	37	Metal Shop	Lead	19.5		Floor	Concrete
WIPE 37WP04	37	Metal Shop	Chromium	6.29		Floor	Concrete
WIPE 37WP04	37	Metal Shop	Lead	45.7		Floor	Concrete
WIPE 37WP04B	37	Metal Shop	Chromium	5.63		Floor	Concrete
WIPE 37WP04B	37	Metal Shop	Lead	44.2		Floor	Concrete
WIPE 37WP53	37	Metal Shop	Arsenic	1.82		I-Beam	
WIPE 37WP53	37	Metal Shop	Barium	89.6		I-Beam	
WIPE 37WP53	37	Metal Shop	Beryllium	0.0456		I-Beam	
WIPE 37WP53	37	Metal Shop	Cadmium	3.97		I-Beam	
WIPE 37WP53	37	Metal Shop	Chromium	34.3		I-Beam	
WIPE 37WP53	37	Metal Shop	Lead	166		I-Beam	
WIPE 37WP53	37	Metal Shop	Nickel	42.5		I-Beam	
WIPE 37WP53	37	Metal Shop	PCB 1260	0.148		I-Beam	
WIPE 37WP54	37	Metal Shop	Arsenic	2.64		I-Beam	
WIPE 37WP54	37	Metal Shop	Barium	79.1		I-Beam	
WIPE 37WP54	37	Metal Shop	Beryllium	0.0522		I-Beam	
WIPE 37WP54	37	Metal Shop	Cadmium	3.3		I-Beam	
WIPE 37WP54	37	Metal Shop	Chromium	36.9		I-Beam	
WIPE 37WP54	37	Metal Shop	Lead	180		I-Beam	
WIPE 37WP54	37	Metal Shop	Nickel	47.8		I-Beam	
WIPE 37WP54	37	Metal Shop	PCB 1260	0.266		I-Beam	
WIPE 37WP01	37	Metal Shop	Lead	4.86		Wall	Brick
WIPE 37WP02	37	Metal Shop	Lead	7.53		Wall	Brick
WIPE 37WP17	37	P/E Stor.	Chromium	106		Floor	Concrete
WIPE 37WP17	37	P/E Stor.	Lead	9.97		Floor	Concrete
WIPE 37WP18	37	P/E Stor.	Chromium	446		Floor	Concrete
WIPE 37WP18	37	P/E Stor.	Lead	8.76		Floor	Concrete
WIPE 39WP10	39	104	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP10B	39	104	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP16	39	108	Chrysene	0.48		Floor	Tile
WIPE 39WP24	39	140	Chromium	0.93		Floor	Tile
WIPE 39WP25	39	140	Chromium	15.3		Fume Hood	
WIPE 39WP247	39	141	bis (2-Ethylhexyl) Phthalate	2.5	GT	Exhaust Vent	
WIPE 39WP247	39	141	Lead	29.4		Exhaust Vent	
WIPE 39WP27	39	142	Chromium	1.37		Floor	Tile
WIPE 39WP27	39	142	Lead	9.51		Floor	Tile
WIPE 39WP29	39	144	Chromium	1.14		Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 39WP29	39	144	Lead	3.83		Floor	Tile
WIPE 39WP32	39	145	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Tile
WIPE 39WP32	39	145	Butylbenzyl Phthalate	3.3	GT	Floor	Tile
WIPE 39WP32	39	145	Chromium	1.37		Floor	Tile
WIPE 39WP32	39	145	Di-n-Butyl Phthalate	3.3	GT	Floor	Tile
WIPE 39WP32	39	145	Lead	10.6		Floor	Tile
WIPE 39WP40	39	153	Chrysene	0.44		Floor	Tile
WIPE 39WP39	39	153	Chromium	4.27		Wall	Painted Dry Wall
WIPE 39WP39	39	153	Chromium	1.01		Wall	Painted Dry Wall
WIPE 39WP43	39	156	Lead	21.9		Wall	Dry Wall
WIPE 39WP46	39	159	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP46	39	159	Lead	9.76		Floor	Tile
WIPE 39WP48	39	161	Benzo [A] Anthracene	4		Floor	Tile
WIPE 39WP48	39	161	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 39WP48	39	161	Chromium	2.47		Floor	Tile
WIPE 39WP48	39	161	Lead	5.07		Floor	Tile
WIPE 39WP50	39	162	Arsenic	71		Floor	Concrete
WIPE 39WP50	39	162	Beryllium	0.0513		Floor	Concrete
WIPE 39WP50	39	162	Chromium	314		Floor	Concrete
WIPE 39WP50	39	162	Lead	73.5		Floor	Concrete
WIPE 39WP50	39	162	Nickel	180		Floor	Concrete
WIPE 39WP49	39	162	Chromium	1.58		Wall	Painted CB
WIPE 39WP58	39	163	PCB 1254	1.61		Floor	Concrete
WIPE 39WP58B	39	163	PCB 1254	1.72		Floor	Concrete
WIPE 39WP52	39	164	Lead	25		Floor	Tile
WIPE 39WP54	39	165	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP54	39	165	Chromium	1.01		Floor	Tile
WIPE 39WP54	39	165	Lead	3.92		Floor	Tile
WIPE 39WP53	39	165	Lead	3.91		Wall	Dry Wall
WIPE 39WP56	39	171	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 39WP56	39	171	Chromium	1.39		Floor	Concrete
WIPE 39WP56	39	171	Lead	19.1		Floor	Concrete
WIPE 39WP56B	39	171	Lead	8.84		Floor	Concrete
WIPE 39WP74	39	206	bis (2-Ethylhexyl) Phthalate	33	GT	Floor	Tile
WIPE 39WP74	39	206	Butylbenzyl Phthalate	33	GT	Floor	Tile
WIPE 39WP74	39	206	Lead	6.36		Floor	Tile
WIPE 39WP74B	39	206	bis (2-Ethylhexyl) Phthalate	33	GT	Floor	Tile
WIPE 39WP74B	39	206	Butylbenzyl Phthalate	33	GT	Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 39WP75	39	206	Lead	4.32		Fume Hood	
WIPE 39WP75B	39	206	Lead	20.3		Fume Hood	
WIPE 39WP73	39	206	Lead	3.63		Wall	Dry Wall
WIPE 39WP69	39	207	Chromium	6.48		Floor	Tile
WIPE 39WP77	39	227	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 39WP77	39	227	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 39WP77	39	227	Di-n-Butyl Phthalate	2.5	GT	Floor	Tile
WIPE 39WP76	39	227	Lead	5.13		Wall	Dry Wall
WIPE 39WP92	39	243	Barium	28.3		Floor	Concrete
WIPE 39WP92	39	243	Benzo [A] Anthracene	0.6		Floor	Concrete
WIPE 39WP92	39	243	Chromium	7.31		Floor	Concrete
WIPE 39WP92	39	243	Chrysene	0.6		Floor	Concrete
WIPE 39WP92	39	243	Lead	13.2		Floor	Concrete
WIPE 39WP93	39	243	Barium	51		Floor	Concrete
WIPE 39WP93	39	243	Chromium	5.3		Floor	Concrete
WIPE 39WP93	39	243	Lead	8.46		Floor	Concrete
WIPE 39WP90	39	243	Lead	3.82		Wall	Concrete Block
WIPE 39WP91	39	243	Chromium	1.13		Wall	Concrete Block
WIPE 39WP91	39	243	Lead	5.6		Wall	Concrete Block
WIPE 39WP88	39	244	Barium	28.7		Floor	Concrete
WIPE 39WP88	39	244	Beryllium	0.0854		Floor	Concrete
WIPE 39WP88	39	244	Chromium	2.56		Floor	Concrete
WIPE 39WP88	39	244	Lead	18.1		Floor	Concrete
WIPE 39WP89	39	244	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Concrete
WIPE 39WP89	39	244	Chromium	2.07		Floor	Concrete
WIPE 39WP89	39	244	Lead	16.3		Floor	Concrete
WIPE 39WP89B	39	244	Barium	36		Floor	Concrete
WIPE 39WP89B	39	244	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Concrete
WIPE 39WP89B	39	244	Chromium	4.32		Floor	Concrete
WIPE 39WP89B	39	244	Lead	19.2		Floor	Concrete
WIPE 39WP84	39	247	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 39WP84	39	247	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 39WP84	39	247	Chromium	11.3		Floor	Tile
WIPE 39WP84	39	247	Lead	6.15		Floor	Tile
WIPE 39WP84	39	247	Nickel	33		Floor	Tile
WIPE 39WP85	39	247	Barium	40.2		Floor	Tile
WIPE 39WP85	39	247	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 39WP85	39	247	Butylbenzyl Phthalate	5	GT	Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 39WP85	39	247	Chromium	2.67		Floor	Tile
WIPE 39WP85	39	247	Lead	11.4		Floor	Tile
WIPE 39WP249	39	248	Butylbenzyl Phthalate	5	GT	Floor	Metal
WIPE 39WP107	39	301	Barium	29.1		Wall	Painted Brick
WIPE 39WP107	39	301	Lead	40.8		Wall	Painted Brick
WIPE 39WP124B	39	331	Chromium	1.06		Floor	Tile
WIPE 39WP126	39	331	Chromium	1.82		Fume Hood	
WIPE 39WP121	39	331	Lead	3.01		Wall	Dry Wall
WIPE 39WP139	39	403	Chromium	1.61		Floor	Tile
WIPE 39WP139	39	403	Lead	20.7		Floor	Tile
WIPE 39WP152	39	419	Lead	72.3		Floor	Tile
WIPE 39WP154	39	431	Mercury	7		Floor	Tile
WIPE 39WP156	39	450	Cadmium	127		Floor	Tile
WIPE 39WP156	39	450	Chromium	2.44		Floor	Tile
WIPE 39WP156	39	450	Lead	10.6		Floor	Tile
WIPE 39WP159	39	501	Lead	4.14		Wall	Brick
WIPE 39WP235	39	503	Di-n-Butyl Phthalate	5	GT	Floor	Concrete
WIPE 39WP163	39	505	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 39WP163	39	505	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 39WP163	39	505	Di-n-Octyl Phthalate	1.2	GT	Floor	Tile
WIPE 39WP163	39	505	Lead	7.05		Floor	Tile
WIPE 39WP171	39	509	Chromium	4.19		Floor	Tile
WIPE 39WP172	39	509	Lead	5.79		Fume Hood	
WIPE 39WP172	39	509	Mercury	11.2		Fume Hood	
WIPE 39WP170	39	509	Lead	19.1		Wall	Dry Wall
WIPE 39WP171	39	510	Barium	20.8		Floor	Tile
WIPE 39WP171	39	510	Lead	47.8		Floor	Tile
WIPE 39WP178	39	512	Barium	36.4		Floor	Tile
WIPE 39WP178	39	512	Beryllium	0.0483		Floor	Tile
WIPE 39WP178	39	512	Chromium	12.1		Floor	Tile
WIPE 39WP178	39	512	Di-n-Butyl Phthalate	62	GT	Floor	Tile
WIPE 39WP178	39	512	Lead	68		Floor	Tile
WIPE 39WP179	39	512	Antimony	23.5		Fume Hood	
WIPE 39WP179	39	512	Chromium	2.19		Fume Hood	
WIPE 39WP179B	39	512	Antimony	36.3		Fume Hood	
WIPE 39WP179B	39	512	Chromium	1.35		Fume Hood	
WIPE 39WP177	39	512	Barium	32		Wall	Painted Dry Wall
WIPE 39WP180	39	513	Lead	4.41		Wall	Dry Wall

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 39WP183	39	514	Di-n-Butyl Phthalate	62	GT	Floor	Tile
WIPE 39WP184	39	514	Chromium	0.938		Fume Hood	
WIPE 39WP182	39	514	Lead	8.42		Wall	Dry Wall
WIPE 39WP186	39	515	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP185	39	515	bis (2-Ethylhexyl) Phthalate	2.5	GT	Wall	Dry Wall
WIPE 39WP185	39	515	Di-n-Octyl Phthalate	1.3	GT	Wall	Dry Wall
WIPE 39WP198	39	521	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 39WP199	39	521	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Tile
WIPE 39WP199	39	521	Butylbenzyl Phthalate	3.3	GT	Floor	Tile
WIPE 39WP199	39	521	Lead	22.9		Floor	Tile
WIPE 39WP201	39	521	Chromium	2		Fume Hood	
WIPE 39WP201	39	521	Lead	8.21		Fume Hood	
WIPE 39WP206	39	521	Chromium	1.16		Fume Hood	
WIPE 39WP206	39	521	Lead	7.91		Fume Hood	
WIPE 39WP194	39	521	Lead	20.2		Wall	Dry Wall
WIPE 39WP195	39	521	Cadmium	5.29		Wall	Dry Wall
WIPE 39WP195	39	521	Chromium	1.18		Wall	Dry Wall
WIPE 39WP195	39	521	Lead	43.2		Wall	Dry Wall
WIPE 39WP196	39	521	Barium	22.1		Wall	Dry Wall
WIPE 39WP196	39	521	Chromium	2.08		Wall	Dry Wall
WIPE 39WP196	39	521	Lead	8.22		Wall	Dry Wall
WIPE 39WP210	39	529	Lead	5.01		Wall	Dry Wall
WIPE 39WP218	39	531	Lead	3.3		Fume Hood	
WIPE 39WP221	39	532	Chromium	2.58		Floor	Tile
WIPE 39WP221	39	532	Lead	3.52		Floor	Tile
WIPE 39WP208	39	537	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 39WP207	39	537	Arsenic	6.74		Wall	Dry Wall
WIPE 39WP207	39	537	Chromium	1.03		Wall	Dry Wall
WIPE 39WP230	39	538	Cadmium	128		Floor	Tile
WIPE 39WP230	39	538	Chromium	704		Floor	Tile
WIPE 39WP230	39	538	Lead	382		Floor	Tile
WIPE 39WP230	39	538	Nickel	77.2		Floor	Tile
WIPE 39WP243	39	538	Chromium	5.1		Floor	Tile
WIPE 39WP242	39	538	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 39WP242	39	538	Cadmium	43.6		Floor Drain	
WIPE 39WP242	39	538	Chromium	231		Floor Drain	
WIPE 39WP242	39	538	Lead	301		Floor Drain	
WIPE 39WP242	39	538	Nickel	52.7		Floor Drain	

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 39WP231	39	538	Chromium	12.4		Fume Hood	
WIPE 39WP231	39	538	Lead	9.76		Fume Hood	
WIPE 39WP231	39	538	Nickel	55.4		Fume Hood	
WIPE 39WP232	39	538	bis (2-Ethylhexyl) Phthalate	9.9	GT	Fume Hood	
WIPE 39WP232	39	538	Chromium	28		Fume Hood	
WIPE 39WP232	39	538	Lead	47.3		Fume Hood	
WIPE 39WP232	39	538	Nickel	34.7		Fume Hood	
WIPE 39WP232B	39	538	Cadmium	8.26		Fume Hood	
WIPE 39WP232B	39	538	Chromium	15.1		Fume Hood	
WIPE 39WP232B	39	538	Lead	33.3		Fume Hood	
WIPE 39WP232B	39	538	Nickel	35.4		Fume Hood	
WIPE 39WP229	39	538	Chromium	5.16		Wall	Dry Wall
WIPE 39WP03	39	101A	Barium	204		Floor	Concrete
WIPE 39WP03	39	101A	Chromium	6.85		Floor	Concrete
WIPE 39WP03	39	101A	Lead	46.1		Floor	Concrete
WIPE 39WP04	39	101A	Barium	91.5		Floor	Concrete
WIPE 39WP04	39	101A	Chromium	2.1		Floor	Concrete
WIPE 39WP04	39	101A	Lead	15.3		Floor	Concrete
WIPE 39WP07	39	101B	Barium	117		Floor	Concrete
WIPE 39WP07	39	101B	Chromium	2.55		Floor	Concrete
WIPE 39WP07	39	101B	Lead	194		Floor	Concrete
WIPE 39WP08	39	101B	Barium	27		Floor	Concrete
WIPE 39WP08	39	101B	Chromium	1.89		Floor	Concrete
WIPE 39WP08	39	101B	Lead	9.86		Floor	Concrete
WIPE 39WP12	39	107A	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 39WP12	39	107A	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP12	39	107A	Di-n-Butyl Phthalate	5	GT	Floor	Tile
WIPE 39WP124	39	107A	Lead	4.23		Floor	Tile
WIPE 39WP14	39	107B	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 39WP14	39	107B	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 39WP14	39	107B	Di-n-Butyl Phthalate	5	GT	Floor	Tile
WIPE 39WP42	39	155B	Barium	68.5		Floor	Tile
WIPE 39WP42	39	155B	Chromium	6.83		Floor	Tile
WIPE 39WP42	39	155B	Lead	22.7		Floor	Tile
WIPE 39WP41	39	155B	Lead	4.05		Wall	Dry Wall
WIPE 39WP61	39	201/202	Butylbenzyl Phthalate	33	GT	Floor	Concrete
WIPE 39WP64	39	201/202	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 39WP64	39	201/202	Cadmium	5.72		Floor Drain	

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 39WP64	39	201/202	Chromium	21.5		Floor Drain	
WIPE 39WP64	39	201/202	Lead	416		Floor Drain	
WIPE 39WP64	39	201/202	Nickel	41.9		Floor Drain	
WIPE 39WP96	39	243A	Barium	78		Floor	Concrete
WIPE 39WP96	39	243A	Chromium	4.56		Floor	Concrete
WIPE 39WP96	39	243A	Lead	11.1		Floor	Concrete
WIPE 39WP97	39	243A	Barium	26.9		Floor	Concrete
WIPE 39WP97	39	243A	Chromium	5.07		Floor	Concrete
WIPE 39WP97	39	243A	Lead	24.6		Floor	Concrete
WIPE 39WP261	39	303A	Benzo [A] Anthracene	0.66		Floor	Tile
WIPE 39WP260	39	333A	Di-n-Butyl Phthalate	5	GT	Floor	Tile
WIPE 39WP147	39	403A	Barium	48.6		Floor	Tile
WIPE 39WP147	39	403A	Chromium	3.06		Floor	Tile
WIPE 39WP147	39	403A	Lead	23.4		Floor	Tile
WIPE 39WP148	39	403A	Lead	10.8		Fume Hood	
WIPE 39WP143	39	413A	Lead	16.3		Floor	Tile
WIPE 39WP257	39	501A	Chromium	2.62		Floor	Tile
WIPE 39WP257	39	501A	Lead	335		Floor	Tile
WIPE 39WP256	39	501A	Lead	7.08		Wall	Dry Wall
WIPE 39WP99	39	D	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Tile
WIPE 39WP99	39	D	Butylbenzyl Phthalate	3.3	GT	Floor	Tile
WIPE 39WP99	39	D	Chromium	470		Floor	Tile
WIPE 39WP99	39	D	Lead	5.26		Floor	Tile
WIPE 39WP99	39	D	Nickel	1040		Floor	Tile
WIPE 39WP99	39	D	PCB 1254	0.246		Floor	Tile
WIPE 39WP101	39	E	Barium	21.8		Floor	Metal
WIPE 39WP101	39	E	Chromium	10.1		Floor	Metal
WIPE 39WP101	39	E	Lead	5.24		Floor	Metal
WIPE 39WP101	39	E	Nickel	112		Floor	Metal
WIPE 39WP100	39	E	PCB 1260	0.0581		Wall	Concrete Block
WIPE 39WP103	39	F	Barium	31.8		Floor	Metal
WIPE 39WP103	39	F	Chromium	3.09		Floor	Metal
WIPE 39WP103	39	F	Lead	9.28		Floor	Metal
WIPE 39WP103	39	F	Nickel	18.7		Floor	Metal
WIPE 39WP103	39	F	PCB 1254	1.11		Floor	Metal
WIPE 43WP14	43	Central	Chromium	12.7		Floor	Surface Removed
WIPE 43WP14	43	Central	Lead	25.9		Floor	Surface Removed
WIPE 43WP14	43	Central	Nickel	28.8		Floor	Surface Removed

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 43WP15	43	Central	Chromium	11.1		Floor	Surface Removed
WIPE 43WP15	43	Central	Nickel	19.9		Floor	Surface Removed
WIPE 43WP01	43	Central	Chromium	0.95		I-Beam	
WIPE 43WP01	43	Central	Lead	5.64		I-Beam	
WIPE 43WP02	43	Central	Chromium	1.61		I-Beam	
WIPE 43WP02	43	Central	Lead	10.9		I-Beam	
WIPE 43WP13	43	Central	Chromium	4.01		Wall	Painted Brick
WIPE 43WP13	43	Central	Lead	24.6		Wall	Painted Brick
WIPE 43WP13	43	Central	PCB 1260	0.13		Wall	Painted Brick
WIPE 43WP09	43	DU Cage	Barium	31.6		Floor/Wall	Surface Removed
WIPE 43WP09	43	DU Cage	Cadmium	16.6		Floor/Wall	Surface Removed
WIPE 43WP09	43	DU Cage	Chromium	4.63		Floor/Wall	Surface Removed
WIPE 43WP09	43	DU Cage	Lead	37		Floor/Wall	Surface Removed
WIPE 43WP03	43	Mach. Area	Chromium	2.49		Floor	Surface Removed
WIPE 43WP03	43	Mach. Area	Lead	9.95		Floor	Surface Removed
WIPE 43WP03B	43	Mach. Area	Chromium	1.59		Floor	Surface Removed
WIPE 43WP03B	43	Mach. Area	Lead	5.56		Floor	Surface Removed
WIPE 43WP04	43	Mach. Area	Beryllium	0.0898		Wall	Painted Brick
WIPE 43WP04	43	Mach. Area	Chromium	2.93		Wall	Painted Brick
WIPE 43WP06	43	Scale Rm.	Chromium	1.63		Floor	Surface Removed
WIPE 43WP08	43	Sto. Rm.	Chromium	3.27		Floor	Surface Removed
WIPE 43WP08	43	Sto. Rm.	Lead	13.2		Floor	Surface Removed
WIPE 43WP07	43	Sto. Rm.	Chromium	21.7		Wall	Painted Brick
WIPE 43WP07	43	Sto. Rm.	Lead	14.2		Wall	Painted Brick
WIPE 60WP03	60	105.1	PCB 1254	0.0556		Floor	Concrete
WIPE 60WP04	60	105.3	PCB 1254	0.453		Floor	Concrete
WIPE 60WP09	60	106	Benzo [A] Anthracene	5.4		Floor	Painted Concrete
WIPE 60WP09	60	106	Benzo [A] Pyrene	3.3		Floor	Painted Concrete
WIPE 60WP09	60	106	Chrysene	9.6		Floor	Painted Concrete
WIPE 60WP09	60	106	Phenanthrene	9.6	GT	Floor	Painted Concrete
WIPE 60WP09	60	106	Pyrene	5	GT	Floor	Painted Concrete
WIPE 97WP03	97	1	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 97WP14	97	143	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 97WP15	97	143	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 97WP16	97	143	Chromium	10.2		Fume Hood	
WIPE 97WP16B	97	143	Chromium	30.1		Fume Hood	
WIPE 97WP10	97	144	Butylbenzyl Phthalate	3.3	GT	Floor	Tile
WIPE 97WP21	97	146	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 97WP21	97	146	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 97WP21	97	146	Lead	4.94		Floor	Tile
WIPE 97WP22	97	146	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 97WP07	97	2 (lab)	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 97WP08	97	2 (mach.)	Butylbenzyl Phthalate	5	GT	Wall	Brick
WIPE 111WP05	111	0.1	Chromium	1.02		Floor	Concrete
WIPE 111WP05	111	0.1	Lead	102		Floor	Concrete
WIPE 111WP03	111	3.1	Lead	335		Floor	Wood
WIPE 117WP02	117	0.1	DDE	0.1	GT	Floor	Concrete
WIPE 117WP02	117	0.1	DDT	0.1	GT	Floor	Concrete
WIPE 117WP02	117	0.1	Lead	14.4		Floor	Concrete
WIPE 117WP02B	117	0.1	DDE	0.1	GT	Floor	Concrete
WIPE 117WP02B	117	0.1	DDT	0.1	GT	Floor	Concrete
WIPE 117WP02B	117	0.1	Lead	38.9		Floor	Concrete
WIPE 118WP01	118	1.1	Butylbenzyl Phthalate	9.9	GT	Floor	Wood
WIPE 118WP01	118	1.1	Di-n-Octyl Phthalate	9.9	GT	Floor	Wood
WIPE 118WP02	118	1.2	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor	Wood
WIPE 131WP02	131	2	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 131WP02	131	2	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 131WP02	131	2	Chromium	1.37		Floor	Concrete
WIPE 131WP02	131	2	Lead	7.65		Floor	Concrete
WIPE 131WP04	131	3	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 131WP04	131	3	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 131WP08	131	39	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 131WP08	131	39	Di-n-Octyl Phthalate	2.5	GT	Floor	Concrete
WIPE 131WP09	131	39	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 131WP09	131	39	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 131WP06	131	152	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 131WP06	131	152	Di-n-Butyl Phthalate	5	GT	Floor	Tile
WIPE 131WP06	131	152	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 131WP05	131	152	bis (2-Ethylhexyl) Phthalate	5	GT	Wall	Dry Wall
WIPE 131WP05	131	152	Butylbenzyl Phthalate	5	GT	Wall	Dry Wall
WIPE 243WP02	243	1	Chromium	1		Floor	Concrete
WIPE 243WP02	243	1	Lead	4.97		Floor	Concrete
WIPE 243WP02B	243	1	Chromium	3.84		Floor	Concrete
WIPE 243WP02B	243	1	Lead	24.8		Floor	Concrete
WIPE 243WP03	243	1	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 243WP03	243	1	Chromium	4.11		Floor Drain	

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 243WP03	243	1	Lead	24.9		Floor Drain	
WIPE 243WP05	243	2	Chromium	0.985		Floor	Concrete
WIPE 243WP05	243	2	DDT	0.1	GT	Floor	Concrete
WIPE 243WP05	243	2	Dieldrin	0.0846		Floor	Concrete
WIPE 243WP05	243	2	Endrin	0.05	GT	Floor	Concrete
WIPE 243WP05	243	2	Lead	4.67		Floor	Concrete
WIPE 243WP05	243	2	PCB 1254	2	GT	Floor	Concrete
WIPE 243WP06	243	2	Chromium	1.22		Floor Drain	
WIPE 243WP06	243	2	DDT	0.2	GT	Floor Drain	
WIPE 243WP06	243	2	Endrin	0.1	GT	Floor Drain	
WIPE 243WP06	243	2	Lead	5.94		Floor Drain	
WIPE 243WP06	243	2	PCB 1254	1.64		Floor Drain	
WIPE 243WP04	243	2	PCB 1260	0.0527		Wall	Concrete Block
WIPE 243WP08	243	3	Chromium	5.18		Floor	Concrete
WIPE 243WP08	243	3	DDT	1	GT	Floor	Concrete
WIPE 243WP08	243	3	Dieldrin	0.322		Floor	Concrete
WIPE 243WP08	243	3	Endrin	0.5	GT	Floor	Concrete
WIPE 243WP08	243	3	Lead	12		Floor	Concrete
WIPE 243WP08	243	3	PCB 1254	6.89		Floor	Concrete
WIPE 243WP10	243	4	Barium	54.5		Floor	Concrete
WIPE 243WP10	243	4	Beryllium	0.058		Floor	Concrete
WIPE 243WP10	243	4	Chromium	17.6		Floor	Concrete
WIPE 243WP10	243	4	Lead	18		Floor	Concrete
WIPE BNKWP01	245	Bunker - right	2.4-Dinitrotoluene	1.5		Floor	Concrete
WIPE 292WP37	292	106	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor	Concrete
WIPE 292WP37	292	106	Cadmium	3.99		Floor	Concrete
WIPE 292WP37	292	106	PCB 1254	0.0928		Floor	Concrete
WIPE 292WP37	292	106	PCB 1260	0.402		Floor	Concrete
WIPE 292WP04	292	119	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP04	292	119	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP04	292	119	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 292WP06	292	120	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP06	292	120	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP06	292	120	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 292WP07	292	120	Chromium	2.47		Fume Hood	
WIPE 292WP09	292	121	Beryllium	0.0574		Floor	Tile
WIPE 292WP09	292	121	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP09	292	121	Butylbenzyl Phthalate	5	GT	Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 292WP11	292	122	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP28	292	125	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP28	292	125	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP29	292	125	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP29	292	125	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP30	292	125	Benzo [B] Fluoranthene	0.61		Fume Hood	
WIPE 292WP31	292	125	Chromium	6.97		Fume Hood	
WIPE 292WP31B	292	125	Chromium	10.4		Fume Hood	
WIPE 292WP34	292	128	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP34	292	128	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP34	292	128	PCB 1254	0.0524		Floor	Tile
WIPE 292WP35	292	128	Chromium	1.34		Fume Hood	
WIPE 292WP39	292	132	Chromium	1.05		Floor	Concrete
WIPE 292WP39	292	132	Endrin	0.05	GT	Floor	Concrete
WIPE 292WP39	292	132	Lead	10		Floor	Concrete
WIPE 292WP39	292	132	PCB 1260	0.45		Floor	Concrete
WIPE 292WP40	292	132	beta-Endosulfan	0.0705	GT	Floor Drain	
WIPE 292WP40	292	132	bis (2-Ethylhexyl) Phthalate	5	GT	Floor Drain	
WIPE 292WP40	292	132	Chromium	3.95		Floor Drain	
WIPE 292WP40	292	132	DDT	0.1	GT	Floor Drain	
WIPE 292WP40	292	132	Dieldrin	0.1	GT	Floor Drain	
WIPE 292WP40	292	132	Endrin	0.05	GT	Floor Drain	
WIPE 292WP40	292	132	Lead	24.8		Floor Drain	
WIPE 292WP40	292	132	Methoxychlor	0.267		Floor Drain	
WIPE 292WP40	292	132	PCB 1260	2	GT	Floor Drain	
WIPE 292WP38	292	132	Lead	6.44		Wall	Concrete Block
WIPE 292WP38	292	132	PCB 1260	0.149		Wall	Concrete Block
WIPE 292WP13	292	133	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP13	292	133	PCB 1254	0.0902		Floor	Tile
WIPE 292WP13	292	133	PCB 1260	0.0718		Floor	Tile
WIPE 292WP21	292	134	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP21	292	134	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP21	292	134	Cadmium	3.05		Floor	Tile
WIPE 292WP19	292	135	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor	Tile
WIPE 292WP16	292	136	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP16	292	136	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP24	292	137	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor	Tile
WIPE 292WP24	292	137	Butylbenzyl Phthalate	9.9	GT	Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 292WP02	292	138	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP02	292	138	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP54	292	205	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP54	292	205	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP54	292	205	Lead	22.3		Floor	Tile
WIPE 292WP57	292	206	Beryllium	0.0411		Wall	Painted CB
WIPE 292WP60	292	209	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP60	292	209	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP63	292	212	Beryllium	0.035		Floor	Tile
WIPE 292WP63	292	212	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP63	292	212	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP63B	292	212	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP63B	292	212	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP65	292	213	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP65	292	213	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP65	292	213	Di-n-Butyl Phthalate	5	GT	Floor	Tile
WIPE 292WP56	292	226	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP51	292	227	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP51	292	227	Di-n-Butyl Phthalate	5	GT	Floor	Tile
WIPE 292WP49	292	228	Chromium	1.38		Exhaust Vent	
WIPE 292WP52	292	228	Chromium	4.53		Exhaust Vent	
WIPE 292WP68	292	233	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP70	292	235	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP77	292	236	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP77	292	236	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP74	292	237	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP79	292	239	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP79	292	239	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP81	292	243	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP42	292	244	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 292WP42	292	244	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 292WP41	292	244	bis (2-Ethylhexyl) Phthalate	5	GT	Wall	Concrete Block
WIPE 292WP85	292	247	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor	Tile
WIPE 292WP83	292	250	Cadmium	3.26		Floor	Tile
WIPE 292WP83	292	250	Lead	36		Floor	Tile
WIPE 292WP83B	292	250	Cadmium	3.23		Floor	Tile
WIPE 292WP83B	292	250	Lead	169		Floor	Tile
WIPE 311WP02	311	1	Chromium	1.84		Floor	Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 311WP02	311	1	Lead	12.2		Floor	Concrete
WIPE 311WP01	311	1	Barium	37.5		Wall	Painted CB
WIPE 311WP01	311	1	Chromium	1.93		Wall	Painted CB
WIPE 311WP01	311	1	Lead	21.6		Wall	Painted CB
WIPE 311WP11	311	3	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 311WP11	311	3	Chromium	1.44		Floor	Concrete
WIPE 311WP11	311	3	Lead	4.98		Floor	Concrete
WIPE 311WP13	311	4	Barium	27.2		Floor	Concrete
WIPE 311WP13	311	4	Cadmium	11.3		Floor	Concrete
WIPE 311WP13	311	4	Chromium	66.9		Floor	Concrete
WIPE 311WP13	311	4	Lead	78.3		Floor	Concrete
WIPE 311WP13B	311	4	Cadmium	2.49		Floor	Concrete
WIPE 311WP13B	311	4	Chromium	25		Floor	Concrete
WIPE 311WP13B	311	4	Lead	34.6		Floor	Concrete
WIPE 311WP15	311	5	Cadmium	7.42		Floor	Concrete
WIPE 311WP15	311	5	Chromium	24.2		Floor	Concrete
WIPE 311WP15	311	5	Lead	59.8		Floor	Concrete
WIPE 311WP14	311	5	Barium	19.1		Wall	Concrete Block
WIPE 311WP14	311	5	Beryllium	0.0655		Wall	Concrete Block
WIPE 311WP14	311	5	Lead	10.7		Wall	Concrete Block
WIPE 311WP17	311	6	Benzo [A] Anthracene	0.68		Floor	Concrete
WIPE 311WP17	311	6	Chromium	11.9		Floor	Concrete
WIPE 311WP17	311	6	Lead	55.2		Floor	Concrete
WIPE 311WP16	311	6	Chromium	1.17		Wall	Concrete Block
WIPE 311WP16	311	6	Lead	10.3		Wall	Concrete Block
WIPE 311WP19	311	7	Chromium	12		Floor	Concrete
WIPE 311WP19	311	7	Dieldrin	0.0884		Floor	Concrete
WIPE 311WP19	311	7	Endrin	0.05	GT	Floor	Concrete
WIPE 311WP19	311	7	Lead	31.2		Floor	Concrete
WIPE 311WP19	311	7	Lindane	0.1	GT	Floor	Concrete
WIPE 311WP19	311	7	Methoxychlor	0.552		Floor	Concrete
WIPE 311WP18	311	7	Lead	8.46		Wall	Concrete Block
WIPE 311WP21	311	8	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 311WP21	311	8	Chromium	12.4		Floor	Concrete
WIPE 311WP21	311	8	Lead	62.6		Floor	Concrete
WIPE 311WP20	311	8	Lead	4.37		Wall	Concrete Block
WIPE 311WP07	311	10	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 311WP08	311	10	Butylbenzyl Phthalate	3.3	GT	Wall	Metal

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 311WP04	311	11	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Metal
WIPE 311WP04	311	11	Chromium	2.65		Floor	Metal
WIPE 311WP04	311	11	Lead	11.2		Floor	Metal
WIPE 311WP05	311	11	Chromium	3.62		Floor	Metal
WIPE 311WP05	311	11	Lead	17.5		Floor	Metal
WIPE 311WP03	311	11	Barium	62.7		Wall	Painted CB
WIPE 311WP03	311	11	Chromium	5.96		Wall	Painted CB
WIPE 311WP03	311	11	Lead	58.5		Wall	Painted CB
WIPE 311WP24	311	12	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 311WP24	311	12	Chromium	7.06		Floor	Concrete
WIPE 311WP24	311	12	Lead	33.4		Floor	Concrete
WIPE 311WP25	311	12	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 311WP25	311	12	Chromium	6.74		Floor	Concrete
WIPE 311WP25	311	12	Lead	20.2		Floor	Concrete
WIPE 311WP26	311	12	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 311WP26	311	12	Chromium	3.26		Floor	Concrete
WIPE 311WP26	311	12	Lead	13.4		Floor	Concrete
WIPE 311WP26B	311	12	Chromium	5.84		Floor	Concrete
WIPE 311WP26B	311	12	DDT	0.1	GT	Floor	Concrete
WIPE 311WP26B	311	12	Endrin	0.05	GT	Floor	Concrete
WIPE 311WP26B	311	12	Lead	14.4		Floor	Concrete
WIPE 311WP23	311	12	bis (2-Ethylhexyl) Phthalate	3.3	GT	Wall	Brick
WIPE 311WP23	311	12	Chromium	11.8		Wall	Brick
WIPE 311WP23	311	12	Fluoranthene	3.3	GT	Wall	Brick
WIPE 311WP23	311	12	Lead	31.6		Wall	Brick
WIPE 311WP28	311	14	Beryllium	0.103		Floor	Concrete
WIPE 311WP28	311	14	Chromium	7.16		Floor	Concrete
WIPE 311WP28	311	14	Lead	38.7		Floor	Concrete
WIPE 311WP27	311	14	Chromium	1.55		Wall	Concrete Block
WIPE 311WP27	311	14	Lead	12.4		Wall	Concrete Block
WIPE 311WP31	311	19	Beryllium	0.0443		Floor	Concrete
WIPE 311WP31	311	19	Cadmium	6.11		Floor	Concrete
WIPE 311WP31	311	19	Chromium	1.65		Floor	Concrete
WIPE 311WP31	311	19	Lead	10.2		Floor	Concrete
WIPE 311WP32	311	19	Cadmium	5.5		Floor	Concrete
WIPE 311WP32	311	19	Chromium	3.26		Floor	Concrete
WIPE 311WP32	311	19	Lead	18.3		Floor	Concrete
WIPE 311WP30	311	19	Lead	16.8		Wall	Brick

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 311WP34	311	20	Benzo [A] Anthracene	0.53		Floor	Concrete
WIPE 311WP34	311	20	Chromium	4.82		Floor	Concrete
WIPE 311WP34	311	20	Lead	44.2		Floor	Concrete
WIPE 311WP33	311	20	Lead	26.2		Wall	Brick
WIPE 311WP36	311	21	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Concrete
WIPE 311WP36	311	21	Chromium	5.52		Floor	Concrete
WIPE 311WP36	311	21	Lead	44.2		Floor	Concrete
WIPE 311WP36	311	21	PCB 1260	0.133	GT	Floor	Concrete
WIPE 311WP37	311	22	Barium	35.3		Floor	Concrete
WIPE 311WP37	311	22	Beryllium	0.0441		Floor	Concrete
WIPE 311WP37	311	22	Chromium	5.73		Floor	Concrete
WIPE 311WP37	311	22	Lead	23.3		Floor	Concrete
WIPE 311WP38	311	23	Chromium	4.44		Floor	Concrete
WIPE 311WP38	311	23	Lead	12.8		Floor	Concrete
WIPE 311WP41	311	24	Butylbenzyl Phthalate	2.5	GT	Wall	Metal
WIPE 311WP41	311	24	Di-n-Octyl Phthalate	1.2	GT	Wall	Metal
WIPE 311WP40	311	25	Chromium	12.3		Floor	Metal
WIPE 311WP40	311	25	Lead	6.78		Floor	Metal
WIPE 311WP40	311	25	Nickel	19.2		Floor	Metal
WIPE 311WP39	311	25	Chromium	1.41		Wall	Concrete Block
WIPE 311WP39	311	25	Lead	25.4		Wall	Concrete Block
WIPE 311WP29	311	26	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Metal
WIPE 311WP29	311	26	Chromium	9.84		Floor	Metal
WIPE 311WP29	311	26	DDT	0.1	GT	Floor	Metal
WIPE 311WP29	311	26	Lead	31.5		Floor	Metal
WIPE 311WP71	311	26	Cadmium	2.99		Floor	Metal
WIPE 311WP71	311	26	Chromium	2.16		Floor	Metal
WIPE 311WP71	311	26	Lead	14.8		Floor	Metal
WIPE 311WP70	311	26	Lead	8.22		Wall	Dry Wall
WIPE 311WP67	311	27	Chromium	5.01		Floor	Concrete
WIPE 311WP67	311	27	Lead	21.4		Floor	Concrete
WIPE 311WP67	311	27	Nickel	20.6		Floor	Concrete
WIPE 311WP68	311	28	beta-Endosulfan	0.047	GT	Floor	Concrete
WIPE 311WP68	311	28	Chromium	4.2		Floor	Concrete
WIPE 311WP68	311	28	Lead	22.5		Floor	Concrete
WIPE 311WP69	311	28	Chromium	2.41		Floor	Concrete
WIPE 311WP69	311	28	Lead	16.2		Floor	Concrete
WIPE 311WP35	311	30	Barium	22		Floor	Metal

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 311WP35	311	30	Chromium	10.1		Floor	Metal
WIPE 311WP35	311	30	DDT	0.067	GT	Floor	Metal
WIPE 311WP35	311	30	Lead	51.6		Floor	Metal
WIPE 311WP35	311	30	Nickel	20.4		Floor	Metal
WIPE 311WP58	311	31	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Metal
WIPE 311WP58	311	31	Chromium	1.2		Floor	Metal
WIPE 311WP58	311	31	Lead	4.74		Floor	Metal
WIPE 311WP57	311	31	Lead	11.4		Wall	Dry Wall
WIPE 311WP73	311	32	Chromium	1.84		Floor	Metal
WIPE 311WP73	311	32	Lead	12.5		Floor	Metal
WIPE 311WP75	311	33	Chromium	2.13		Floor	Wood
WIPE 311WP75	311	33	Lead	11.2		Floor	Wood
WIPE 311WP75	311	33	PCB 1254	0.0608		Floor	Wood
WIPE 311WP77	311	34	Chromium	1.1		Floor	Concrete
WIPE 311WP79	311	35	RDX	13.2		Floor	Concrete
WIPE 311WP81	311	37	Chromium	2.99		Floor	Concrete
WIPE 311WP81	311	37	Lead	17.7		Floor	Concrete
WIPE 311WP80	311	37	Chromium	1.02		Wall	Concrete Block
WIPE 311WP80	311	37	Lead	9.61		Wall	Concrete Block
WIPE 311WP83	311	38	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 311WP83	311	38	Lead	4.54		Floor	Tile
WIPE 311WP85	311	39	DDT	0.1	GT	Floor	Tile
WIPE 311WP85	311	39	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 311WP85	311	39	Lead	22.3		Floor	Tile
WIPE 311WP44	311	100	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 311WP44	311	100	Di-n-Octyl Phthalate	1.2	GT	Floor	Tile
WIPE 311WP44	311	100	Endrin	0.05	GT	Floor	Tile
WIPE 311WP43	311	100	Butylbenzyl Phthalate	2.5	GT	Wall	Metal
WIPE 311WP46	311	102	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 311WP46	311	102	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 311WP47	311	102	Chromium	1.02		Fume Hood	
WIPE 311WP47B	311	102	Chromium	1.51		Fume Hood	
WIPE 311WP49	311	104	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 311WP49	311	104	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 311WP49	311	104	Lead	3.68		Floor	Tile
WIPE 311WP48	311	104	bis (2-Ethylhexyl) Phthalate	2.5	GT	Wall	Metal
WIPE 311WP48	311	104	Butylbenzyl Phthalate	2.5	GT	Wall	Metal
WIPE 311WP51	311	105	Butylbenzyl Phthalate	5	GT	Floor	Tile

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 311WP51	311	105	Chromium	1.01		Floor	Tile
WIPE 311WP51	311	105	Lead	4.27		Floor	Tile
WIPE 311WP50	311	105	Butylbenzyl Phthalate	2.5	GT	Wall	Metal
WIPE 311WP53	311	107	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 311WP53	311	107	Chromium	1.41		Floor	Tile
WIPE 311WP53	311	107	Lead	14.9		Floor	Tile
WIPE 311WP56	311	109	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 311WP56	311	109	Di-n-Octyl Phthalate	5	GT	Floor	Tile
WIPE 311WP56	311	109	Endrin	0.05	GT	Floor	Tile
WIPE 311WP64	311	110	Butylbenzyl Phthalate	9.9	GT	Floor	Tile
WIPE 311WP66	311	112	Butylbenzyl Phthalate	25	GT	Floor	Tile
WIPE 311WP89	311	East Central	Barium	21.5		I-Beam	
WIPE 311WP89	311	East Central	Chromium	1.71		I-Beam	
WIPE 311WP89	311	East Central	Lead	11.8		I-Beam	
WIPE 311WP61	311	Mezzanine	Chromium	12.9		Floor	Concrete
WIPE 311WP61	311	Mezzanine	Lead	9.35		Floor	Concrete
WIPE 311WP62	311	Mezzanine	Chromium	8.48		Floor	Concrete
WIPE 311WP62	311	Mezzanine	Lead	40.1		Floor	Concrete
WIPE 311WP87	311	West	Benzo [A] Anthracene	0.72		I-Beam	
WIPE 311WP87	311	West	Chromium	9.94		I-Beam	
WIPE 311WP87	311	West	Chrysene	0.74		I-Beam	
WIPE 311WP87	311	West	Lead	96		I-Beam	
WIPE 311WP88	311	West Central	Chromium	18		I-Beam	
WIPE 311WP88	311	West Central	Lead	164		I-Beam	
WIPE 311WP88	311	West Central	Nickel	19.1		I-Beam	
WIPE 312WP45	312	1.2	Barium	31.1		Floor	Concrete
WIPE 312WP45	312	1.2	Beryllium	0.0378		Floor	Concrete
WIPE 312WP45	312	1.2	Cadmium	14.9		Floor	Concrete
WIPE 312WP45	312	1.2	Chromium	14.5		Floor	Concrete
WIPE 312WP45	312	1.2	Lead	34		Floor	Concrete
WIPE 312WP46	312	1.2	Barium	29.4		Floor	Concrete
WIPE 312WP46	312	1.2	Cadmium	24.2		Floor	Concrete
WIPE 312WP46	312	1.2	Chromium	10.5		Floor	Concrete
WIPE 312WP46	312	1.2	Lead	158		Floor	Concrete
WIPE 312WP46	312	1.2	Nickel	48.3		Floor	Concrete
WIPE 312WP33	312	1.3	Beryllium	0.0373		Floor	Concrete
WIPE 312WP33	312	1.3	Cadmium	6.46		Floor	Concrete
WIPE 312WP33	312	1.3	Chromium	3.16		Floor	Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 312WP33	312	1.3	Lead	28.1		Floor	Concrete
WIPE 312WP34	312	1.3	Beryllium	0.0426		Floor	Concrete
WIPE 312WP34	312	1.3	Cadmium	3.13		Floor	Concrete
WIPE 312WP34	312	1.3	Chromium	4.07		Floor	Concrete
WIPE 312WP34	312	1.3	Lead	41.7		Floor	Concrete
WIPE 312WP31	312	1.3	Beryllium	0.449		Wall	Concrete
WIPE 312WP47	312	1.4	Lead	3.68		Wall	Concrete
WIPE 312WP50	312	1.5	RDX	1.94		Floor	Concrete
WIPE 312WP92	312	1.7	Chromium	4.29		Floor	Concrete
WIPE 312WP92	312	1.7	Lead	9.22		Floor	Concrete
WIPE 312WP92B	312	1.7	Beryllium	0.0387		Floor	Concrete
WIPE 312WP92B	312	1.7	Cadmium	3.19		Floor	Concrete
WIPE 312WP92B	312	1.7	Chromium	5.89		Floor	Concrete
WIPE 312WP92B	312	1.7	Lead	18		Floor	Concrete
WIPE 312WP110	312	3	Beryllium	0.533		Floor	Concrete
WIPE 312WP110	312	3	Lead	6.83		Floor	Concrete
WIPE 312WP111	312	3	Beryllium	0.163		Floor	Concrete
WIPE 312WP111	312	3	Chromium	1.49		Floor	Concrete
WIPE 312WP111	312	3	Lead	10.3		Floor	Concrete
WIPE 312WP109	312	3.1	Beryllium	5.5		Floor	Concrete
WIPE 312WP109	312	3.1	Chromium	2		Floor	Concrete
WIPE 312WP109	312	3.1	Lead	27.8		Floor	Concrete
WIPE 312WP113	312	3.2	Beryllium	5.71		Floor	Concrete
WIPE 312WP113	312	3.2	Chromium	2.52		Floor	Concrete
WIPE 312WP113	312	3.2	Lead	15.2		Floor	Concrete
WIPE 312WP112	312	3.2	Beryllium	0.0456		Wall	Dry Wall
WIPE 312WP29	312	101	Beryllium	24.7		Exhaust Vent	
WIPE 312WP29	312	101	Chromium	1.38		Exhaust Vent	
WIPE 312WP29	312	101	Lead	3.45		Exhaust Vent	
WIPE 312WP25	312	101	Beryllium	0.286		Floor	Surface Removed
WIPE 312WP25	312	101	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP25	312	101	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP25	312	101	Chromium	0.98		Floor	Surface Removed
WIPE 312WP25	312	101	Lead	4.29		Floor	Surface Removed
WIPE 312WP25	312	101	PCB 1260	0.0805		Floor	Surface Removed
WIPE 312WP26	312	101	Beryllium	0.108		Floor	Surface Removed
WIPE 312WP26	312	101	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP26	312	101	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 312WP26	312	101	Chromium	1.22		Floor	Surface Removed
WIPE 312WP26	312	101	PCB 1260	0.098		Floor	Surface Removed
WIPE 312WP26B	312	101	Beryllium	0.033		Floor	Surface Removed
WIPE 312WP26B	312	101	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP26B	312	101	Di-n-Butyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP26B	312	101	PCB 1260	0.0841		Floor	Surface Removed
WIPE 312WP27	312	101	Beryllium	0.266		Fume Hood	
WIPE 312WP27	312	101	Chromium	1.27		Fume Hood	
WIPE 312WP94	312	101.1	Chromium	2.8		Floor	Concrete
WIPE 312WP94	312	101.1	Lead	19.1		Floor	Concrete
WIPE 312WP23	312	102	Beryllium	0.128		Floor	Surface Removed
WIPE 312WP22	312	102	bis (2-Ethylhexyl) Phthalate	2.5	GT	Wall	Painted Concrete
WIPE 312WP22	312	102	Butylbenzyl Phthalate	2.5	GT	Wall	Painted Concrete
WIPE 312WP22	312	102	Lead	3.62		Wall	Painted Concrete
WIPE 312WP21	312	103	Beryllium	0.158		Floor	Surface Removed
WIPE 312WP21	312	103	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP21	312	103	Cadmium	3.93		Floor	Surface Removed
WIPE 312WP21	312	103	Chromium	1.04		Floor	Surface Removed
WIPE 312WP21	312	103	Di-n-Butyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP21	312	103	Lead	7.01		Floor	Surface Removed
WIPE 312WP16	312	105	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 312WP16	312	105	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 312WP16	312	105	Chromium	1.28		Floor	Concrete
WIPE 312WP68B	312	110	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP68B	312	110	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP68B	312	110	Di-n-Octyl Phthalate	2.5	GT	Floor	Surface Removed
WIPE 312WP63	312	111	Beryllium	0.0324		Exhaust Vent	
WIPE 312WP63	312	111	Lead	3.54		Exhaust Vent	
WIPE 312WP64	312	111	Beryllium	0.196		Exhaust Vent	
WIPE 312WP64	312	111	Chromium	1.21		Exhaust Vent	
WIPE 312WP64	312	111	Lead	9.38		Exhaust Vent	
WIPE 312WP62	312	111	Beryllium	0.0448		Floor	Surface Removed
WIPE 312WP62	312	111	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP62	312	111	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP62	312	111	Cadmium	50.7		Floor	Surface Removed
WIPE 312WP62	312	111	Di-n-Octyl Phthalate	2.5	GT	Floor	Surface Removed
WIPE 312WP62	312	111	Lead	11.5		Floor	Surface Removed
WIPE 312WP66	312	111	Beryllium	0.111		Floor	Surface Removed

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 312WP66	312	111	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP66	312	111	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP66	312	111	Cadmium	124		Floor	Surface Removed
WIPE 312WP66	312	111	Di-n-Octyl Phthalate	2.5	GT	Floor	Surface Removed
WIPE 312WP66	312	111	Lead	7.24		Floor	Surface Removed
WIPE 312WP65	312	111	Lead	5.51		Wall	Dry Wall
WIPE 312WP19	312	113	Beryllium	4.02		Floor	Concrete
WIPE 312WP19	312	113	Cadmium	20.2		Floor	Concrete
WIPE 312WP19	312	113	Chromium	5.76		Floor	Concrete
WIPE 312WP19	312	113	Lead	20.8		Floor	Concrete
WIPE 312WP30	312	114	Beryllium	95.5		Exhaust Vent	
WIPE 312WP30	312	114	Lead	5.7		Exhaust Vent	
WIPE 312WP02	312	114	Beryllium	0.653		Floor	Concrete
WIPE 312WP02	312	114	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 312WP02B	312	114	Beryllium	0.403		Floor	Concrete
WIPE 312WP02B	312	114	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 312WP02B	312	114	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 312WP02B	312	114	Cadmium	3.45		Floor	Concrete
WIPE 312WP02B	312	114	Chromium	0.973		Floor	Concrete
WIPE 312WP03	312	114	Beryllium	4.29		Floor	Concrete
WIPE 312WP03	312	114	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 312WP03	312	114	Cadmium	3.7		Floor	Concrete
WIPE 312WP03	312	114	Chromium	0.987		Floor	Concrete
WIPE 312WP03	312	114	Di-n-Butyl Phthalate	5	GT	Floor	Concrete
WIPE 312WP05	312	114	Beryllium	0.0996		Floor Drain	
WIPE 312WP05	312	114	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP05	312	114	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 312WP05	312	114	Cadmium	3.57		Floor Drain	
WIPE 312WP05	312	114	Chromium	1.13		Floor Drain	
WIPE 312WP06	312	114	Beryllium	1.75		Floor Drain	
WIPE 312WP06	312	114	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP06	312	114	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 312WP06	312	114	Cadmium	36.6		Floor Drain	
WIPE 312WP06	312	114	Chromium	1.05		Floor Drain	
WIPE 312WP07	312	114	Beryllium	5.3		Floor Drain	
WIPE 312WP07	312	114	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP07	312	114	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 312WP07	312	114	Cadmium	11.6		Floor Drain	

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 312WP07	312	114	Chromium	4.8		Floor Drain	
WIPE 312WP08	312	114	Beryllium	0.164		Floor Drain	
WIPE 312WP08	312	114	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP08	312	114	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 312WP01	312	114	Beryllium	0.0347		Wall	Dry Wall
WIPE 312WP04	312	114	Beryllium	0.0662		Wall	Dry Wall
WIPE 312WP11	312	115	Beryllium	0.329		Floor	Surface Removed
WIPE 312WP11	312	115	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP11	312	115	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP11	312	115	Cadmium	9.71		Floor	Surface Removed
WIPE 312WP11	312	115	Chromium	1.71		Floor	Surface Removed
WIPE 312WP12	312	115	Beryllium	0.158		Floor	Surface Removed
WIPE 312WP12	312	115	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP12	312	115	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP12	312	115	Cadmium	29.3		Floor	Surface Removed
WIPE 312WP13	312	115	Beryllium	0.164		Floor Drain	
WIPE 312WP13	312	115	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP13	312	115	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 312WP13	312	115	Cadmium	10.6		Floor Drain	
WIPE 312WP13	312	115	Chromium	0.946		Floor Drain	
WIPE 312WP14	312	115	Beryllium	0.0963		Floor Drain	
WIPE 312WP14	312	115	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP14	312	115	Butylbenzyl Phthalate	9.9	GT	Floor Drain	
WIPE 312WP14	312	115	Cadmium	2.64		Floor Drain	
WIPE 312WP14	312	115	Chromium	2.17		Floor Drain	
WIPE 312WP57	312	117	Cadmium	5.35		Exhaust Vent	
WIPE 312WP57	312	117	Lead	6.39		Exhaust Vent	
WIPE 312WP58	312	117	Cadmium	7.14		Exhaust Vent	
WIPE 312WP58	312	117	Chromium	1.25		Exhaust Vent	
WIPE 312WP55	312	117	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP55	312	117	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP55	312	117	Cadmium	5.31		Floor	Surface Removed
WIPE 312WP55	312	117	Di-n-Octyl Phthalate	2.5	GT	Floor	Surface Removed
WIPE 312WP56	312	117	Beryllium	0.0314		Floor	Surface Removed
WIPE 312WP56	312	117	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP56	312	117	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP56	312	117	Cadmium	29.9		Floor	Surface Removed
WIPE 312WP56	312	117	Di-n-Octyl Phthalate	2.5	GT	Floor	Surface Removed

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 312WP56B	312	117	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP56B	312	117	Butylbenzyl Phthalate	5	GT	Floor	Surface Removed
WIPE 312WP56B	312	117	Cadmium	5.31		Floor	Surface Removed
WIPE 312WP56B	312	117	Di-n-Octyl Phthalate	2.5	GT	Floor	Surface Removed
WIPE 312WP59	312	117	Beryllium	0.0313		Floor Drain	
WIPE 312WP59	312	117	bis (2-Ethylhexyl) Phthalate	5	GT	Floor Drain	
WIPE 312WP59	312	117	Butylbenzyl Phthalate	5	GT	Floor Drain	
WIPE 312WP59	312	117	Cadmium	102		Floor Drain	
WIPE 312WP59	312	117	Chromium	2.05		Floor Drain	
WIPE 312WP59	312	117	Di-n-Octyl Phthalate	2.5	GT	Floor Drain	
WIPE 312WP60	312	117	Beryllium	0.0964		Floor Drain	
WIPE 312WP60	312	117	bis (2-Ethylhexyl) Phthalate	9.9	GT	Floor Drain	
WIPE 312WP60	312	117	Cadmium	164		Floor Drain	
WIPE 312WP60	312	117	Chromium	6.09		Floor Drain	
WIPE 312WP53	312	117	Cadmium	6.06		Wall	Painted CB
WIPE 312WP58	312	118	Beryllium	0.13		Exhaust Vent	
WIPE 312WP58	312	118	Lead	7.96		Exhaust Vent	
WIPE 312WP72	312	118	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 312WP72	312	118	Cadmium	8.34		Floor	Tile
WIPE 312WP72	312	118	Chromium	7.79		Floor	Tile
WIPE 312WP72	312	118	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 312WP74	312	120	Beryllium	0.213		Floor	Concrete
WIPE 312WP74	312	120	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 312WP74	312	120	Cadmium	10.5		Floor	Concrete
WIPE 312WP74	312	120	Di-n-Octyl Phthalate	2.5	GT	Floor	Concrete
WIPE 312WP77	312	120	Beryllium	0.167		Fume Hood	
WIPE 312WP73	312	120	Lead	3.22		Wall	Dry Wall
WIPE 312WP70	312	121	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Painted Concrete
WIPE 312WP70	312	121	Butylbenzyl Phthalate	5	GT	Floor	Painted Concrete
WIPE 312WP70	312	121	Di-n-Octyl Phthalate	2.5	GT	Floor	Painted Concrete
WIPE 312WP76	312	124	Cadmium	5.19		Floor	Concrete
WIPE 312WP79	312	125	Beryllium	0.0633		Floor	Concrete
WIPE 312WP79	312	125	Cadmium	4.75		Floor	Concrete
WIPE 312WP78	312	126	Cadmium	3.71		Floor	Concrete
WIPE 312WP82	312	126	Cadmium	5.52		Floor Drain	
WIPE 312WP83	312	126	Beryllium	0.0438		Floor Drain	
WIPE 312WP83	312	126	Lead	990		Floor Drain	
WIPE 312WP37	312	135	Barium	52.5		Floor	Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 312WP37	312	135	Beryllium	0.0545		Floor	Concrete
WIPE 312WP37	312	135	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Concrete
WIPE 312WP37	312	135	Cadmium	254		Floor	Concrete
WIPE 312WP37	312	135	Chromium	86		Floor	Concrete
WIPE 312WP37	312	135	Lead	62		Floor	Concrete
WIPE 312WP37	312	135	Nickel	27		Floor	Concrete
WIPE 312WP38	312	135	Barium	27.8		Floor	Concrete
WIPE 312WP38	312	135	Cadmium	60.6		Floor	Concrete
WIPE 312WP38	312	135	Chromium	108		Floor	Concrete
WIPE 312WP38	312	135	Lead	34.6		Floor	Concrete
WIPE 312WP38	312	135	Nickel	22.3		Floor	Concrete
WIPE 312WP35	312	135	Chromium	11.2		Wall	Painted Brick
WIPE 312WP35	312	135	Lead	63.5		Wall	Painted Brick
WIPE 312WP36	312	135	Chromium	1.35		Wall	Painted Brick
WIPE 312WP36	312	135	Lead	168		Wall	Painted Brick
WIPE 312WP43	312	137	Chromium	9.4		Fume Hood	
WIPE 312WP43	312	137	Lead	308		Fume Hood	
WIPE 312WP108	312	141	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 312WP108	312	141	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 312WP102	312	142	bis (2-Ethylhexyl) Phthalate	2.5	GT	Floor	Tile
WIPE 312WP102	312	142	Butylbenzyl Phthalate	2.5	GT	Floor	Tile
WIPE 312WP106	312	143	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 312WP106	312	143	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 312WP104	312	144	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 312WP104	312	144	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 312WP100	312	145	Lead	5.75		Floor	Tile
WIPE 312WP98B	312	147	Chromium	2.59		Floor	Tile
WIPE 312WP98B	312	147	Lead	99.4		Floor	Tile
WIPE 312WP96	312	199	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 312WP98	312	199	Lead	17.6		Floor	Tile
WIPE 312WP86	312	199	Chromium	4.53		I-Beam	
WIPE 312WP86	312	199	Lead	54.5		I-Beam	
WIPE 312WP86	312	199	PCB 1260	0.268		I-Beam	
WIPE 312WP89	312	199.1	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 312WP89	312	199.1	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP89	313	0.1	2.4-Dinitrotoluene	28.9		Equipment	
WIPE 313WP89	313	0.1	Lead	5.55		Equipment	
WIPE 313WP90	313	0.1	Lead	4.53		Equipment	

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 313WP91	313	0.2	Chromium	0.983		Floor	Concrete
WIPE 313WP91	313	0.2	Lead	15.8		Floor	Concrete
WIPE 313WP91	313	0.2	RDX	2.8		Floor	Concrete
WIPE 313WP92	313	0.2	Chromium	2.07		Floor	Concrete
WIPE 313WP92	313	0.2	Lead	10.9		Floor	Concrete
WIPE 313WP109	313	0.2	Lead	181		Wall	Concrete
WIPE 313WP110	313	0.2	Lead	8.61		Wall	Concrete
WIPE 313WP66	313	0.3	Chromium	7.65		Floor	Concrete
WIPE 313WP66	313	0.3	Nickel	74		Floor	Concrete
WIPE 313WP67	313	0.3	Chromium	1.94		Floor	Concrete
WIPE 313WP68	313	0.3	Chromium	1.94		Floor	Concrete
WIPE 313WP62	313	0.3	Chromium	1.07		Wall	Concrete Block
WIPE 313WP62	313	0.3	Lead	32		Wall	Concrete Block
WIPE 313WP114	313	0.4	Lead	8.94		Floor	Concrete
WIPE 313WP87B	313	0.5	2.4-Dinitrotoluene	22.3		Filter	
WIPE 313WP106	313	0.6	Antimony	29		Floor	Concrete
WIPE 313WP106	313	0.6	Arsenic	0.682		Floor	Concrete
WIPE 313WP106	313	0.6	Lead	663		Floor	Concrete
WIPE 313WP108	313	0.6	2.4-Dinitrotoluene	1.58		Floor	Concrete
WIPE 313WP104	313	0.6	Lead	81.5		Wall	Concrete Block
WIPE 313WP101	313	0.7	Chromium	2.24		Floor	Concrete
WIPE 313WP101	313	0.7	Lead	1140		Floor	Concrete
WIPE 313WP103	313	0.7	2.4-Dinitrotoluene	5.69		Floor	Concrete
WIPE 313WP99	313	0.7	Lead	49.8		Wall	Concrete
WIPE 313WP96	313	0.8	Lead	25.1		Floor	Concrete
WIPE 313WP98	313	0.8	2.4-Dinitrotoluene	2.66		Floor	Concrete
WIPE 313WP98	313	0.8	RDX	2.64		Floor	Concrete
WIPE 313WP93	313	0.8	Lead	157		Wall	Metal
WIPE 313WP112	313	0.9	Lead	14.4		Floor	Concrete
WIPE 313WP16	313	1.1	Butylbenzyl Phthalate	5	GT	Floor	Concrete
WIPE 313WP14	313	1.1	Lead	7.65		Wall	Painted Brick
WIPE 313WP15	313	1.1	bis (2-Ethylhexyl) Phthalate	2.5	GT	Wall	Painted Brick
WIPE 313WP09	313	1.4	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Painted Concrete
WIPE 313WP09	313	1.4	Chromium	1.93		Floor	Painted Concrete
WIPE 313WP09	313	1.4	Lead	120		Floor	Painted Concrete
WIPE 313WP11	313	1.4	Lead	249		Floor	Painted Concrete
WIPE 313WP25	313	1.5	Chromium	35.1		Floor	Painted Concrete
WIPE 313WP25	313	1.5	Lead	25.3		Floor	Painted Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 313WP25	313	1.5	Nickel	72.2		Floor	Painted Concrete
WIPE 313WP26	313	1.5	Chromium	3.55		Floor	Painted Concrete
WIPE 313WP26	313	1.5	Lead	4.77		Floor	Painted Concrete
WIPE 313WP27	313	1.5	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Painted Concrete
WIPE 313WP27	313	1.5	Butylbenzyl Phthalate	5	GT	Floor	Painted Concrete
WIPE 313WP27	313	1.5	Chromium	4.91		Floor	Painted Concrete
WIPE 313WP27	313	1.5	Lead	4.82		Floor	Painted Concrete
WIPE 313WP160	313	1.5	Arsenic	0.615		I-Beam	
WIPE 313WP160	313	1.5	Benzo [B] Fluoranthene	0.83		I-Beam	
WIPE 313WP160	313	1.5	Cadmium	2.42		I-Beam	
WIPE 313WP160	313	1.5	Chromium	29.9		I-Beam	
WIPE 313WP160	313	1.5	Dibenz [A.H] Anthracene	0.65		I-Beam	
WIPE 313WP160	313	1.5	Lead	18.9		I-Beam	
WIPE 313WP160	313	1.5	Nickel	327		I-Beam	
WIPE 313WP160B	313	1.5	Cadmium	3.93		I-Beam	
WIPE 313WP160B	313	1.5	Chromium	34.5		I-Beam	
WIPE 313WP160B	313	1.5	Lead	27		I-Beam	
WIPE 313WP160B	313	1.5	Nickel	324		I-Beam	
WIPE 313WP23	313	1.5	Chromium	1.65		Wall	Painted Brick
WIPE 313WP24	313	1.5	Chromium	0.954		Wall	Painted Brick
WIPE 313WP45	313	119	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP46	313	119	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP55	313	125	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Painted Concrete
WIPE 313WP55	313	125	Butylbenzyl Phthalate	5	GT	Floor	Painted Concrete
WIPE 313WP56	313	125	Chromium	4.08		Fume Hood	
WIPE 313WP58	313	126	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 313WP58	313	126	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP58	313	126	Chromium	1.22		Floor	Tile
WIPE 313WP61	313	129	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP51	313	138	Barium	23.4		Floor	Concrete
WIPE 313WP51	313	138	Chromium	17		Floor	Concrete
WIPE 313WP51	313	138	Lead	14.5		Floor	Concrete
WIPE 313WP51	313	138	Nickel	33.2		Floor	Concrete
WIPE 313WP52	313	138	Barium	27.7		Floor	Concrete
WIPE 313WP52	313	138	Chromium	24.7		Floor	Concrete
WIPE 313WP52	313	138	Lead	21.1		Floor	Concrete
WIPE 313WP52	313	138	Nickel	37.8		Floor	Concrete
WIPE 313WP53	313	138	Chromium	18.5		Floor	Concrete

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 313WP53	313	138	Lead	23.4		Floor	Concrete
WIPE 313WP53	313	138	Nickel	31.1		Floor	Concrete
WIPE 313WP53B	313	138	Barium	19.5		Floor	Concrete
WIPE 313WP53B	313	138	Butylbenzyl Phthalate	3.3	GT	Floor	Concrete
WIPE 313WP53B	313	138	Chromium	17.1		Floor	Concrete
WIPE 313WP53B	313	138	Lead	31.7		Floor	Concrete
WIPE 313WP53B	313	138	Nickel	43		Floor	Concrete
WIPE 313WP48	313	138	Chromium	2.46		Wall	Painted Brick
WIPE 313WP49	313	138	Chromium	1.51		Wall	Painted Brick
WIPE 313WP50	313	138	Chromium	1.12		Wall	Painted Brick
WIPE 313WP34	313	138.1	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 313WP34	313	138.1	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP34	313	138.1	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 313WP34B	313	138.1	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 313WP34B	313	138.1	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP34B	313	138.1	Di-n-Octyl Phthalate	2.5	GT	Floor	Tile
WIPE 313WP32	313	152	bis (2-Ethylhexyl) Phthalate	5	GT	Floor	Tile
WIPE 313WP32	313	152	Cadmium	11.4		Floor	Tile
WIPE 313WP38	313	153	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Tile
WIPE 313WP38	313	153	Chromium	1.16		Floor	Tile
WIPE 313WP38	313	153	Lead	7.25		Floor	Tile
WIPE 313WP39	313	153	Barium	22.9		Floor	Tile
WIPE 313WP39	313	153	bis (2-Ethylhexyl) Phthalate	3.3	GT	Floor	Tile
WIPE 313WP39	313	153	Butylbenzyl Phthalate	3.3	GT	Floor	Tile
WIPE 313WP39	313	153	Chromium	3.08		Floor	Tile
WIPE 313WP39	313	153	Lead	11.9		Floor	Tile
WIPE 313WP40	313	153	bis (2-Ethylhexyl) Phthalate	2	GT	Floor	Tile
WIPE 313WP40	313	153	Butylbenzyl Phthalate	2	GT	Floor	Tile
WIPE 313WP29	313	193	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP29	313	193	Chromium	1.58		Floor	Tile
WIPE 313WP02	313	194	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP04	313	194	Butylbenzyl Phthalate	5	GT	Wall	Metal
WIPE 313WP18	313	195	Chromium	2.79		Floor	Painted Concrete
WIPE 313WP18	313	195	Lead	87		Floor	Painted Concrete
WIPE 313WP12	313	195	Benzo [B] Fluoranthene	3.3		Fume Hood	
WIPE 313WP21	313	196	Lead	3.64		Floor	Concrete
WIPE 313WP78	313	222	Butylbenzyl Phthalate	9.9	GT	Fume Hood	
WIPE 313WP136	313	227	Chromium	1.06		Fume Hood	

Table A-8
MTL Compounds Above Commercial Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Qualifier	Surface	Material
WIPE 313WP131	313	227	Lead	4.02		Wall	Painted CB
WIPE 313WP132	313	227	Barium	47.7		Wall	Painted CB
WIPE 313WP132	313	227	Chromium	6.44		Wall	Painted CB
WIPE 313WP132	313	227	Lead	396		Wall	Painted CB
WIPE 313WP142	313	258	Butylbenzyl Phthalate	5	GT	Floor	Tile
WIPE 313WP34	313	138A	Chromium	5.87		Floor	Tile
WIPE 313WP34	313	138A	Lead	5.7		Floor	Tile
WIPE 313WP34B	313	138A	Chromium	3.41		Floor	Tile
WIPE 313WP34B	313	138A	Lead	7.91		Floor	Tile
WIPE 313WP159	313	Transformer	PCB 1260	0.229			

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 36WP07	36	0.1	Arsenic	0.349	Floor	Concrete
WIPE 36WP07	36	0.1	Barium	17.3	Floor	Concrete
WIPE 36WP07	36	0.1	Cadmium	1.53	Floor	Concrete
WIPE 36WP07B	36	0.1	Arsenic	0.294	Floor	Concrete
WIPE 36WP07B	36	0.1	Barium	13.5	Floor	Concrete
WIPE 36WP06	36	0.1	Antimony	0.821	Wall	Painted Brick
WIPE 36WP06	36	0.1	Arsenic	0.237	Wall	Painted Brick
WIPE 36WP06	36	0.1	Barium	17.6	Wall	Painted Brick
WIPE 36WP06	36	0.1	Dieldrin	0.0226	Wall	Painted Brick
WIPE 36WP08	36	0.2	Antimony	2.02	Floor	Concrete
WIPE 36WP08	36	0.2	Arsenic	0.322	Floor	Concrete
WIPE 36WP08	36	0.2	Beryllium	0.019	Floor	Concrete
WIPE 36WP08	36	0.2	Cadmium	0.572	Floor	Concrete
WIPE 36WP08	36	0.2	Dieldrin	0.0108	Floor	Concrete
WIPE 36WP08	36	0.2	Nickel	5.18	Floor	Concrete
WIPE 36WP08	36	0.2	Silver	3.45	Floor	Concrete
WIPE 36WP09	36	0.2	Arsenic	0.0825	Wall	Brick
WIPE 36WP09	36	0.2	Barium	2.94	Wall	Brick
WIPE 36WP09	36	0.2	PCB 1260	0.0206	Wall	Brick
WIPE 36WP05	36	0.3	Cadmium	1.17	Floor/Wall	Concrete Block
WIPE 36WP05B	36	0.3	Arsenic	0.198	Floor/Wall	Concrete Block
WIPE 36WP05B	36	0.3	Barium	7.62	Floor/Wall	Concrete Block
WIPE 36WP05B	36	0.3	Cadmium	2.08	Floor/Wall	Concrete Block
WIPE 36WP10	36	0.4	Arsenic	0.557	Wall	Concrete
WIPE 36WP14	36	102	Chrysene	0.12	Floor	Tile
WIPE 36WP13	36	102	Barium	1.56	Wall	Concrete Block
WIPE 36WP04	36	Auditorium	PCB 1260	0.0503	Floor	Concrete
WIPE 36WP01	36	Library	Barium	2.76	Wall	Painted CB
WIPE 37WP50	37	103	Arsenic	0.239	Floor	Concrete
WIPE 37WP50	37	103	Benzo [A] Anthracene	0.23	Floor	Concrete
WIPE 37WP50	37	103	Chrysene	0.28	Floor	Concrete
WIPE 37WP50	37	103	Dieldrin	0.00951	Floor	Concrete
WIPE 37WP50	37	103	Mercury	0.312	Floor	Concrete
WIPE 37WP35	37	104	Chrysene	0.13	Floor	Concrete
WIPE 37WP38	37	106	Arsenic	0.171	Floor	Concrete
WIPE 37WP38	37	106	Barium	5.03	Floor	Concrete
WIPE 37WP38	37	106	Nickel	6.29	Floor	Concrete
WIPE 37WP40	37	107	Antimony	1.57	Floor	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 37WP40	37	107	Arsenic	0.159	Floor	Concrete
WIPE 37WP40	37	107	Barium	4.31	Floor	Concrete
WIPE 37WP40	37	107	Cadmium	1.22	Floor	Concrete
WIPE 37WP40	37	107	Dieldrin	0.00626	Floor	Concrete
WIPE 37WP39	37	107	Chromium	0.371	Wall	Brick
WIPE 37WP11	37	108	Arsenic	0.156	Floor	Concrete
WIPE 37WP11	37	108	Barium	7.41	Floor	Concrete
WIPE 37WP11	37	108	Cadmium	1.17	Floor	Concrete
WIPE 37WP11	37	108	Dieldrin	0.00612	Floor	Concrete
WIPE 37WP11	37	108	Methoxychlor	0.0266	Floor	Concrete
WIPE 37WP10	37	110	Barium	1.73	Wall	Concrete Block
WIPE 37WP12	37	111	Arsenic	0.251	Floor	Concrete
WIPE 37WP12	37	111	Barium	9.21	Floor	Concrete
WIPE 37WP12	37	111	Dieldrin	0.0115	Floor	Concrete
WIPE 37WP12	37	111	Nickel	5.22	Floor	Concrete
WIPE 37WP42	37	113	Barium	2.98	Floor	Concrete
WIPE 37WP42	37	113	Cadmium	0.769	Floor	Concrete
WIPE 37WP41	37	113	Dieldrin	0.0065	Wall	Brick
WIPE 37WP14	37	115	Arsenic	0.23	Floor	Concrete
WIPE 37WP14	37	115	Barium	5.84	Floor	Concrete
WIPE 37WP14	37	115	Dieldrin	0.00832	Floor	Concrete
WIPE 37WP47	37	115	Arsenic	0.129	Floor	Concrete
WIPE 37WP47	37	115	Chromium	0.796	Floor	Concrete
WIPE 37WP13	37	115	Chromium	0.372	Wall	Brick
WIPE 37WP48	37	115	Chromium	0.387	Wall	Brick
WIPE 37WP44	37	116	Barium	2.94	Floor	Concrete
WIPE 37WP43	37	116	Barium	1.72	Wall	Brick
WIPE 37WP43	37	116	Chromium	0.321	Wall	Brick
WIPE 37WP33	37	121	Arsenic	0.28	Floor	Concrete
WIPE 37WP33	37	121	Barium	10	Floor	Concrete
WIPE 37WP31	37	127	Arsenic	0.384	Floor	Tile
WIPE 37WP31	37	127	Barium	1.18	Floor	Tile
WIPE 37WP29	37	128	Barium	1.16	Floor	Tile
WIPE 37WP37	37	113A	Barium	9.55	Floor	Concrete
WIPE 37WP37	37	113A	Cadmium	0.65	Floor	Concrete
WIPE 37WP37	37	113A	Dieldrin	0.00716	Floor	Concrete
WIPE 37WP37	37	113A	Nickel	6.34	Floor	Concrete
WIPE 37WP36	37	113A	Chromium	0.586	Wall	Brick

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 37WP20	37	Auto Shop	Barium	2.41	Floor	Concrete
WIPE 37WP22	37	Auto Shop	Aldrin	0.03	Floor	Concrete
WIPE 37WP22	37	Auto Shop	Barium	1.84	Floor	Concrete
WIPE 37WP22	37	Auto Shop	Dieldrin	0.0274	Floor	Concrete
WIPE 37WP22B	37	Auto Shop	Aldrin	0.0587	Floor	Concrete
WIPE 37WP22B	37	Auto Shop	Barium	1.68	Floor	Concrete
WIPE 37WP22B	37	Auto Shop	Dieldrin	0.0665	Floor	Concrete
WIPE 37WP27	37	Auto Shop	Barium	8.8	Floor Drain	
WIPE 37WP27	37	Auto Shop	Nickel	7.02	Floor Drain	
WIPE 37WP51	37	Auto Shop	Aldrin	0.0312	I-Beam	
WIPE 37WP51	37	Auto Shop	Benzo [K] Fluoranthene	0.26	I-Beam	
WIPE 37WP51	37	Auto Shop	Dieldrin	0.03	I-Beam	
WIPE 37WP51	37	Auto Shop	Methoxychlor	0.203	I-Beam	
WIPE 37WP51	37	Auto Shop	Vanadium	10.4	I-Beam	
WIPE 37WP52	37	Auto Shop	Aldrin	0.02	I-Beam	
WIPE 37WP52	37	Auto Shop	Barium	18.8	I-Beam	
WIPE 37WP52	37	Auto Shop	Cadmium	1.51	I-Beam	
WIPE 37WP52	37	Auto Shop	Dieldrin	0.00854	I-Beam	
WIPE 37WP19	37	Auto Shop	Chromium	0.292	Wall	Brick
WIPE 37WP21	37	Auto Shop	Barium	1.12	Wall	Brick
WIPE 37WP21	37	Auto Shop	Chromium	0.406	Wall	Brick
WIPE 37WP24	37	Bat Storage	Arsenic	0.194	Floor	Concrete
WIPE 37WP24	37	Bat Storage	Barium	4.06	Floor	Concrete
WIPE 37WP24	37	Bat Storage	Nickel	15.6	Floor	Concrete
WIPE 37WP26	37	Garage	Chromium	0.57	Floor	Concrete
WIPE 37WP06	37	Ind Eqi Shop	Arsenic	0.172	Floor	Concrete
WIPE 37WP06	37	Ind Eqi Shop	Barium	3.58	Floor	Concrete
WIPE 37WP08	37	Ind Eqi Shop	Barium	1.38	Floor	Concrete
WIPE 37WP08	37	Ind Eqi Shop	Dieldrin	0.00594	Floor	Concrete
WIPE 37WP05	37	Ind Eqi Shop	Arsenic	0.165	Wall	Brick
WIPE 37WP05	37	Ind Eqi Shop	Chromium	0.636	Wall	Brick
WIPE 37WP07	37	Ind Eqi Shop	Chromium	0.319	Wall	Brick
WIPE 37WP03	37	Met Shop	Barium	3.5	Floor	Concrete
WIPE 37WP04	37	Met Shop	Barium	3.78	Floor	Concrete
WIPE 37WP04	37	Met Shop	Cadmium	0.684	Floor	Concrete
WIPE 37WP04	37	Met Shop	Nickel	4.77	Floor	Concrete
WIPE 37WP04B	37	Met Shop	Arsenic	0.186	Floor	Concrete
WIPE 37WP04B	37	Met Shop	Barium	4.2	Floor	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 37WP04B	37	Met Shop	Cadmium	0.609	Floor	Concrete
WIPE 37WP04B	37	Met Shop	Dieldrin	0.00611	Floor	Concrete
WIPE 37WP01	37	Met Shop	Barium	4.93	Wall	Brick
WIPE 37WP01	37	Met Shop	Chromium	0.666	Wall	Brick
WIPE 37WP02	37	Met Shop	Chromium	0.692	Wall	Brick
WIPE 37WP53	37	Metal Shop	Aldrin	0.0255	I-Beam	
WIPE 37WP53	37	Metal Shop	Dieldrin	0.0108	I-Beam	
WIPE 37WP53	37	Metal Shop	Mercury	0.377	I-Beam	
WIPE 37WP53	37	Metal Shop	Vanadium	7.29	I-Beam	
WIPE 37WP54	37	Metal Shop	Aldrin	0.035	I-Beam	
WIPE 37WP54	37	Metal Shop	Dieldrin	0.0143	I-Beam	
WIPE 37WP54	37	Metal Shop	Vanadium	7.82	I-Beam	
WIPE 37WP17	37	P/E Storage	Arsenic	0.161	Floor	Concrete
WIPE 37WP17	37	P/E Storage	Barium	7.33	Floor	Concrete
WIPE 37WP17	37	P/E Storage	Cadmium	0.653	Floor	Concrete
WIPE 37WP18	37	P/E Storage	Barium	15.8	Floor	Concrete
WIPE 37WP18	37	P/E Storage	Benzo [A] Anthracene	0.08	Floor	Concrete
WIPE 37WP18	37	P/E Storage	Cadmium	0.65	Floor	Concrete
WIPE 37WP15	37	P/E Storage	Arsenic	0.084	Wall	Brick
WIPE 37WP15	37	P/E Storage	Chromium	0.417	Wall	Brick
WIPE 37WP16	37	P/E Storage	Arsenic	0.137	Wall	Brick
WIPE 37WP16	37	P/E Storage	Chromium	0.33	Wall	Brick
WIPE 39WP10	39	104	Benzo [A] Anthracene	0.13	Floor	Tile
WIPE 39WP10	39	104	Chrysene	0.19	Floor	Tile
WIPE 39WP16	39	108	Benzo [A] Anthracene	0.17	Floor	Tile
WIPE 39WP16	39	108	Butylbenzyl Phthalate	19	Floor	Tile
WIPE 39WP22	39	113	Chromium	0.301	Floor	Concrete
WIPE 39WP22	39	113	Chrysene	0.08	Floor	Concrete
WIPE 39WP25	39	140	Nickel	8.64	Fume Hood	
WIPE 39WP247	39	141	Arsenic	0.125	Exhaust Vent	
WIPE 39WP247	39	141	Barium	2.54	Exhaust Vent	
WIPE 39WP247	39	141	Chromium	0.84	Exhaust Vent	
WIPE 39WP245	39	141	Aldrin	0.0227	Floor	Tile
WIPE 39WP245B	39	141	Aldrin	0.0152	Floor	Tile
WIPE 39WP246	39	141	Aldrin	0.00584	Wall	Dry Wall
WIPE 39WP27	39	142	Barium	1.48	Floor	Tile
WIPE 39WP29	39	144	Silver	3.98	Floor	Tile
WIPE 39WP28	39	144	Barium	1.43	Wall	Painted CB

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 39WP28	39	144	Chromium	0.235	Wall	Painted CB
WIPE 39WP32	39	145	Barium	2.31	Floor	Tile
WIPE 39WP33	39	145	Barium	4.55	Fume Hood	
WIPE 39WP34	39	145	Chromium	0.286	Fume Hood	
WIPE 39WP36	39	146	Chromium	0.894	Floor	Tile
WIPE 39WP35	39	146	Chrysene	0.019	Wall	Painted CB
WIPE 39WP40	39	153	Benzo [A] Anthracene	0.17	Floor	Tile
WIPE 39WP40	39	153	Chromium	0.275	Floor	Tile
WIPE 39WP46	39	159	Barium	3.48	Floor	Tile
WIPE 39WP46	39	159	Cadmium	1.23	Floor	Tile
WIPE 39WP46	39	159	Chromium	0.49	Floor	Tile
WIPE 39WP45	39	159	Barium	1.41	Wall	Painted CB
WIPE 39WP48	39	161	Barium	4.91	Floor	Tile
WIPE 39WP48	39	161	Cadmium	0.891	Floor	Tile
WIPE 39WP50	39	162	Barium	12.7	Floor	Concrete
WIPE 39WP50	39	162	Benzo [A] Anthracene	0.07	Floor	Concrete
WIPE 39WP50	39	162	Chrysene	0.13	Floor	Concrete
WIPE 39WP50	39	162	Vanadium	60.7	Floor	Concrete
WIPE 39WP49	39	162	Barium	1.13	Wall	Painted CB
WIPE 39WP52	39	164	Barium	3.52	Floor	Tile
WIPE 39WP52	39	164	Butylbenzyl Phthalate	54	Floor	Tile
WIPE 39WP52	39	164	Chromium	0.416	Floor	Tile
WIPE 39WP54	39	165	Barium	4.65	Floor	Tile
WIPE 39WP53	39	165	Benzo [A] Anthracene	0.05	Wall	Dry Wall
WIPE 39WP53	39	165	Chrysene	0.06	Wall	Dry Wall
WIPE 39WP56	39	171	Antimony	1.58	Floor	Concrete
WIPE 39WP56	39	171	Barium	3.15	Floor	Concrete
WIPE 39WP56	39	171	Cadmium	0.684	Floor	Concrete
WIPE 39WP56	39	171	Silver	3.4	Floor	Concrete
WIPE 39WP56B	39	171	Barium	2.14	Floor	Concrete
WIPE 39WP56B	39	171	Cadmium	0.616	Floor	Concrete
WIPE 39WP56B	39	171	Chromium	0.822	Floor	Concrete
WIPE 39WP72	39	206	bis (2-Ethylhexyl) Phthalate	14	Floor	Tile
WIPE 39WP72	39	206	Butylbenzyl Phthalate	20	Floor	Tile
WIPE 39WP74B	39	206	Chromium	0.242	Floor	Tile
WIPE 39WP73	39	206	Barium	3.21	Wall	Dry Wall
WIPE 39WP73	39	206	Chromium	0.396	Wall	Dry Wall
WIPE 39WP69	39	207	bis (2-Ethylhexyl) Phthalate	12	Floor	Tile

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 39WP69	39	207	Butylbenzyl Phthalate	16	Floor	Tile
WIPE 39WP69	39	207	Nickel	14.2	Floor	Tile
WIPE 39WP76	39	227	Chromium	0.404	Wall	Dry Wall
WIPE 39WP92	39	243	Arsenic	0.118	Floor	Concrete
WIPE 39WP92	39	243	Cadmium	1.07	Floor	Concrete
WIPE 39WP92	39	243	Nickel	15.7	Floor	Concrete
WIPE 39WP93	39	243	Nickel	8.49	Floor	Concrete
WIPE 39WP93B	39	243	Mercury	0.424	Floor	Concrete
WIPE 39WP90	39	243	Barium	4.25	Wall	Concrete Block
WIPE 39WP90	39	243	Chromium	0.686	Wall	Concrete Block
WIPE 39WP91	39	243	Barium	9.73	Wall	Concrete Block
WIPE 39WP88	39	244	Cadmium	0.73	Floor	Concrete
WIPE 39WP88	39	244	Nickel	5.09	Floor	Concrete
WIPE 39WP89	39	244	Arsenic	0.108	Floor	Concrete
WIPE 39WP89	39	244	Barium	18	Floor	Concrete
WIPE 39WP89	39	244	Cadmium	0.887	Floor	Concrete
WIPE 39WP89B	39	244	Antimony	1.61	Floor	Concrete
WIPE 39WP89B	39	244	Cadmium	0.646	Floor	Concrete
WIPE 39WP89B	39	244	Nickel	5.84	Floor	Concrete
WIPE 39WP84	39	247	Barium	5.75	Floor	Tile
WIPE 39WP84	39	247	Cadmium	0.605	Floor	Tile
WIPE 39WP85	39	247	Nickel	13.3	Floor	Tile
WIPE 39WP82	39	247	Butylbenzyl Phthalate	10	Wall	Painted CB
WIPE 39WP82	39	247	Chromium	0.462	Wall	Painted CB
WIPE 39WP249	39	248	Barium	1.81	Floor	Metal
WIPE 39WP249	39	248	Chromium	0.449	Floor	Metal
WIPE 39WP107	39	301	Chromium	0.911	Wall	Painted Brick
WIPE 39WP118	39	328	Benzo [A] Anthracene	0.08	Floor	Tile
WIPE 39WP118	39	328	Chrysene	0.07	Floor	Tile
WIPE 39WP120	39	329	Chromium	0.332	Floor	Tile
WIPE 39WP125	39	331	Chromium	0.52	Fume Hood	
WIPE 39WP126	39	331	Mercury	0.595	Fume Hood	
WIPE 39WP127	39	331	Chromium	0.48	Fume Hood	
WIPE 39WP122	39	331	Mercury	0.99	Wall	Dry Wall
WIPE 39WP130	39	332	Benzo [A] Anthracene	0.11	Floor	Tile
WIPE 39WP132	39	332	Benzo [A] Anthracene	0.21	Fume Hood	
WIPE 39WP132	39	332	Silver	9.44	Fume Hood	
WIPE 39WP139	39	403	Barium	10.1	Floor	Tile

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 39WP138	39	403	Chromium	0.272	Wall	Painted CB
WIPE 39WP142	39	413	Barium	1.27	Floor	Tile
WIPE 39WP142	39	413	Chromium	0.242	Floor	Tile
WIPE 39WP152	39	419	Antimony	1.01	Floor	Tile
WIPE 39WP152	39	419	Barium	2.87	Floor	Tile
WIPE 39WP152	39	419	Cadmium	1.28	Floor	Tile
WIPE 39WP152	39	419	Chromium	0.57	Floor	Tile
WIPE 39WP154	39	431	Chromium	0.289	Floor	Tile
WIPE 39WP239	39	448	Barium	1.58	Floor	Tile
WIPE 39WP239	39	448	Chromium	0.294	Floor	Tile
WIPE 39WP156	39	450	Barium	2.52	Floor	Tile
WIPE 39WP156	39	450	bis (2-Ethylhexyl) Phthalate	10	Floor	Tile
WIPE 39WP158	39	453	Barium	1.43	Floor	Tile
WIPE 39WP158	39	453	Mercury	0.73	Floor	Tile
WIPE 39WP163	39	505	Barium	1.89	Floor	Tile
WIPE 39WP163	39	505	Chromium	0.368	Floor	Tile
WIPE 39WP167	39	506	Chromium	0.466	Floor	Tile
WIPE 39WP171	39	509	bis (2-Ethylhexyl) Phthalate	18	Floor	Tile
WIPE 39WP171	39	509	Cadmium	0.8	Floor	Tile
WIPE 39WP171	39	509	Mercury	0.41	Floor	Tile
WIPE 39WP171	39	509	Nickel	5.18	Floor	Tile
WIPE 39WP172	39	509	Barium	6.74	Fume Hood	
WIPE 39WP172	39	509	Chromium	0.9	Fume Hood	
WIPE 39WP178	39	512	Mercury	0.78	Floor	Tile
WIPE 39WP178	39	512	Nickel	6.43	Floor	Tile
WIPE 39WP181	39	513	Chromium	0.278	Floor	Tile
WIPE 39WP184	39	514	Barium	1.66	Fume Hood	
WIPE 39WP184	39	514	Nickel	4.38	Fume Hood	
WIPE 39WP199	39	521	Chromium	0.328	Floor	Tile
WIPE 39WP206	39	521	Barium	2.02	Fume Hood	
WIPE 39WP206	39	521	Cadmium	0.727	Fume Hood	
WIPE 39WP194	39	521	Barium	6.46	Wall	Dry Wall
WIPE 39WP194	39	521	Chromium	0.766	Wall	Dry Wall
WIPE 39WP195	39	521	Antimony	1.34	Wall	Dry Wall
WIPE 39WP195	39	521	Barium	5.05	Wall	Dry Wall
WIPE 39WP213	39	529	Chromium	0.296	Exhaust Vent	
WIPE 39WP212	39	529	Antimony	3.06	Fume Hood	
WIPE 39WP210	39	529	Chromium	0.245	Wall	Dry Wall

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 39WP216	39	531	Barium	1.3	Floor	Tile
WIPE 39WP216	39	531	Chromium	0.693	Floor	Tile
WIPE 39WP217	39	531	Barium	6.28	Floor	Tile
WIPE 39WP217	39	531	bis (2-Ethylhexyl) Phthalate	42	Floor	Tile
WIPE 39WP217	39	531	Butylbenzyl Phthalate	45	Floor	Tile
WIPE 39WP217	39	531	Chromium	0.543	Floor	Tile
WIPE 39WP215	39	531	Benzo [A] Anthracene	0.07	Wall	Dry Wall
WIPE 39WP221	39	532	Benzo [K] Fluoranthene	0.21	Floor	Tile
WIPE 39WP221	39	532	bis (2-Ethylhexyl) Phthalate	31	Floor	Tile
WIPE 39WP221	39	532	Butylbenzyl Phthalate	12	Floor	Tile
WIPE 39WP227	39	534	Chromium	0.731	Fume Hood	
WIPE 39WP228	39	534	Chromium	0.319	Fume Hood	
WIPE 39WP208	39	537	Chromium	0.668	Floor	Tile
WIPE 39WP230	39	538	Barium	2.62	Floor	Tile
WIPE 39WP230	39	538	Silver	3.72	Floor	Tile
WIPE 39WP243	39	538	Cadmium	0.848	Floor	Tile
WIPE 39WP243	39	538	Cyanide	18.6	Floor	Tile
WIPE 39WP243	39	538	Silver	3.92	Floor	Tile
WIPE 39WP242	39	538	Antimony	2.17	Floor Drain	
WIPE 39WP242	39	538	Barium	1.15	Floor Drain	
WIPE 39WP242	39	538	Cyanide	21.1	Floor Drain	
WIPE 39WP242	39	538	Silver	11.3	Floor Drain	
WIPE 39WP231	39	538	Barium	9.39	Fume Hood	
WIPE 39WP231	39	538	Cadmium	2.16	Fume Hood	
WIPE 39WP231	39	538	Mercury	0.313	Fume Hood	
WIPE 39WP232	39	538	Barium	2	Fume Hood	
WIPE 39WP232	39	538	Cadmium	1.25	Fume Hood	
WIPE 39WP232B	39	538	Barium	3.8	Fume Hood	
WIPE 39WP03	39	101A	Arsenic	0.292	Floor	Concrete
WIPE 39WP03	39	101A	Chrysene	0.25	Floor	Concrete
WIPE 39WP03	39	101A	Mercury	0.735	Floor	Concrete
WIPE 39WP03	39	101A	Nickel	7.03	Floor	Concrete
WIPE 39WP04	39	101A	Mercury	1.52	Floor	Concrete
WIPE 39WP03	39	101A	Cadmium	0.776	Floor	Concrete
WIPE 39WP02	39	101A	Barium	2.42	Wall	Concrete Block
WIPE 39WP02	39	101A	Benzo [A] Anthracene	0.067	Wall	Concrete Block
WIPE 39WP02	39	101A	Chromium	0.43	Wall	Concrete Block
WIPE 39WP02	39	101A	Chrysene	0.083	Wall	Concrete Block

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 39WP08	39	101B	Benzo [A] Anthracene	0.075	Floor	Concrete
WIPE 39WP08	39	101B	Chrysene	0.13	Floor	Concrete
WIPE 39WP124	39	107A	Chromium	0.751	Floor	Tile
WIPE 39WP11	39	107A	Benzo [A] Anthracene	0.02	Wall	Painted CB
WIPE 39WP11	39	107A	Chromium	0.31	Wall	Painted CB
WIPE 39WP42	39	155B	Cadmium	1.12	Floor	Tile
WIPE 39WP42	39	155B	Chrysene	0.1	Floor	Tile
WIPE 39WP42	39	155B	Nickel	7.05	Floor	Tile
WIPE 39WP61	39	210/202	bis (2-Ethylhexyl) Phthalate	11	Floor	Concrete
WIPE 39WP61	39	210/202	Chromium	0.579	Floor	Concrete
WIPE 39WP67	39	210/202	Butylbenzyl Phthalate	19	Floor	Concrete
WIPE 39WP64	39	210/202	Barium	14.6	Floor Drain	
WIPE 39WP79	39	236A	bis (2-Ethylhexyl) Phthalate	15	Floor	Tile
WIPE 39WP96	39	243A	Arsenic	0.088	Floor	Concrete
WIPE 39WP96	39	243A	Beryllium	0.0174	Floor	Concrete
WIPE 39WP96	39	243A	Cadmium	0.59	Floor	Concrete
WIPE 39WP96	39	243A	Nickel	9.86	Floor	Concrete
WIPE 39WP97	39	243A	Beryllium	0.0161	Floor	Concrete
WIPE 39WP97	39	243A	Nickel	6.01	Floor	Concrete
WIPE 39WP94	39	243A	Barium	5.89	Wall	Concrete Block
WIPE 39WP94	39	243A	Chromium	0.531	Wall	Concrete Block
WIPE 39WP95	39	243A	Barium	2.13	Wall	Concrete Block
WIPE 39WP95	39	243A	Chromium	0.854	Wall	Concrete Block
WIPE 39WP253	39	301B	Mercury	2.67	Fume Hood	
WIPE 39WP147	39	403A	Cadmium	0.96	Floor	Tile
WIPE 39WP148	39	403A	Barium	5.66	Fume Hood	
WIPE 39WP148	39	403A	Chromium	0.249	Fume Hood	
WIPE 39WP146	39	403A	Barium	16.4	Wall	Dry Wall
WIPE 39WP143	39	413A	Barium	8.88	Floor	Tile
WIPE 39WP143	39	413A	Chromium	0.34	Floor	Tile
WIPE 39WP257	39	501A	Arsenic	0.0938	Floor	Tile
WIPE 39WP257	39	501A	Barium	10.1	Floor	Tile
WIPE 39WP257	39	501A	Beryllium	0.0173	Floor	Tile
WIPE 39WP256	39	501A	Barium	1.82	Wall	Dry Wall
WIPE 39WP256	39	501A	Chromium	0.342	Wall	Dry Wall
WIPE 39WP99	39	D	Arsenic	0.088	Floor	Tile
WIPE 39WP99	39	D	Barium	12.3	Floor	Tile
WIPE 39WP99	39	D	Benzo [A] Anthracene	0.057	Floor	Tile

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 39WP99	39	D	Cadmium	1.74	Floor	Tile
WIPE 39WP99	39	D	Chrysene	0.09	Floor	Tile
WIPE 39WP98	39	D	Benzo [A] Anthracene	0.03	Wall	Concrete Block
WIPE 39WP98	39	D	Chromium	0.269	Wall	Concrete Block
WIPE 39WP98	39	D	Chrysene	0.033	Wall	Concrete Block
WIPE 43WP12	43	Bay Area	Barium	2.41	Wall	Painted Brick
WIPE 43WP12	43	Bay Area	Chromium	0.3	Wall	Painted Brick
WIPE 43WP14	43	Central	Arsenic	0.147	Floor	Surface Removed
WIPE 43WP14	43	Central	Barium	14.9	Floor	Surface Removed
WIPE 43WP14	43	Central	Cadmium	1.7	Floor	Surface Removed
WIPE 43WP15	43	Central	Aldrin	0.00987	Floor	Surface Removed
WIPE 43WP15	43	Central	Arsenic	0.384	Floor	Surface Removed
WIPE 43WP15	43	Central	Barium	14.6	Floor	Surface Removed
WIPE 43WP15	43	Central	Cadmium	0.764	Floor	Surface Removed
WIPE 43WP01	43	Central	Barium	2.85	I-Beam	
WIPE 43WP01	43	Central	Dieldrin	0.00599	I-Beam	
WIPE 43WP02	43	Central	Barium	13.9	I-Beam	
WIPE 43WP02	43	Central	Cadmium	0.991	I-Beam	
WIPE 43WP02	43	Central	Dieldrin	0.023	I-Beam	
WIPE 43WP02	43	Central	Nickel	4.72	I-Beam	
WIPE 43WP13	43	Central	Aldrin	0.0106	Wall	Painted Brick
WIPE 43WP13	43	Central	Arsenic	0.194	Wall	Painted Brick
WIPE 43WP13	43	Central	Barium	5.76	Wall	Painted Brick
WIPE 43WP13	43	Central	Dieldrin	0.0079	Wall	Painted Brick
WIPE 43WP13	43	Central	Nickel	6.04	Wall	Painted Brick
WIPE 43WP09	43	DU Cage	Arsenic	0.135	Floor/Wall	Surface Removed
WIPE 43WP09	43	DU Cage	Beryllium	0.0124	Floor/Wall	Surface Removed
WIPE 43WP09	43	DU Cage	Nickel	4.59	Floor/Wall	Surface Removed
WIPE 43WP03	43	Mach. Area	Barium	2.92	Floor	Surface Removed
WIPE 43WP03	43	Mach. Area	Mercury	0.795	Floor	Surface Removed
WIPE 43WP03	43	Mach. Area	Nickel	4.75	Floor	Surface Removed
WIPE 43WP03B	43	Mach. Area	Barium	1.56	Floor	Surface Removed
WIPE 43WP03B	43	Mach. Area	Mercury	0.316	Floor	Surface Removed
WIPE 43WP03B	43	Mach. Area	Nickel	4.55	Floor	Surface Removed
WIPE 43WP04	43	Mach. Area	Cadmium	1.28	Wall	Painted Brick
WIPE 43WP04	43	Mach. Area	Nickel	5.88	Wall	Painted Brick
WIPE 43WP06	43	Scale Rm.	Barium	2.35	Floor	Surface Removed
WIPE 43WP06	43	Scale Rm.	Mercury	0.292	Floor	Surface Removed

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 43WP08	43	Sto. Room	Barium	4.13	Floor	Surface Removed
WIPE 43WP08	43	Sto. Room	Nickel	4.91	Floor	Surface Removed
WIPE 43WP07	43	Sto. Room	Arsenic	0.158	Wall	Painted Brick
WIPE 43WP07	43	Sto. Room	Barium	2.93	Wall	Painted Brick
WIPE 43WP07	43	Sto. Room	Nickel	5.7	Wall	Painted Brick
WIPE 60WP04	60	105.3	Dieldrin	0.0241	Floor	Painted Concrete
WIPE 60WP08	60	105.3	Benzo [A] Anthracene	0.31	Floor Drain	
WIPE 60WP08	60	105.3	Chrysene	0.35	Floor Drain	
WIPE 97WP15	97	143	Mercury	0.658	Floor	Tile
WIPE 97WP16	97	143	Nickel	4.8	Fume Hood	
WIPE 97WP16B	97	143	Nickel	16.9	Fume Hood	
WIPE 97WP11	97	144	Chromium	0.846	Fume Hood	
WIPE 97WP33	97	145	Cadmium	0.786	Floor	Tile
WIPE 97WP24	97	146	Chromium	0.449	Fume Hood	
WIPE 97WP25	97	146	Chromium	0.257	Fume Hood	
WIPE 97WP28	97	Air Duct Unit	Barium	1.18	Equipment	
WIPE 97WP28	97	Air Duct Unit	Chromium	0.87	Equipment	
WIPE 97WP29	97	Air Duct Unit	Chromium	0.26	Equipment	
WIPE 97WP27	97	Attic	Benzo [A] Anthracene	0.07	Exhaust Vent	
WIPE 97WP27	97	Attic	Benzo [B] Fluoranthene	0.35	Exhaust Vent	
WIPE 97WP27	97	Attic	Chrysene	0.06	Exhaust Vent	
WIPE 97WP06	97	Machine Shop	Chromium	0.559	Wall	Concrete Block
WIPE 97WP06	97	Machine Shop	Nickel	4.17	Wall	Concrete Block
WIPE 111WP05	111	0.1	Barium	8.16	Floor	Concrete
WIPE 111WP05	111	0.1	Cadmium	0.979	Floor	Concrete
WIPE 111WP03	111	3.1	Arsenic	0.265	Floor	Wood
WIPE 111WP03	111	3.1	Barium	16.3	Floor	Wood
WIPE 111WP03	111	3.1	Chromium	0.511	Floor	Wood
WIPE 111WP03	111	3.1	Dieldrin	0.00674	Floor	Wood
WIPE 117WP02B	117	0.1	Chromium	0.23	Floor	Concrete
WIPE 118WP02	118	1.2	Barium	1.11	Floor	Wood
WIPE 131WP02	131	2	Barium	6.45	Floor	Concrete
WIPE 131WP02	131	2	Dieldrin	0.0795	Floor	Concrete
WIPE 131WP09	131	39	Chromium	0.279	Floor Drain	
WIPE 243WP02B	243	1	Barium	3.23	Floor	Concrete
WIPE 243WP03	243	1	Barium	2.54	Floor Drain	
WIPE 243WP03	243	1	Dieldrin	0.00648	Floor Drain	
WIPE 243WP05	243	2	Barium	1.4	Floor	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 243WP06	243	2	Barium	1.35	Floor Drain	
WIPE 243WP06	243	2	Dieldrin	0.0766	Floor Drain	
WIPE 243WP08	243	3	Arsenic	0.0627	Floor	Concrete
WIPE 243WP08	243	3	Barium	3.72	Floor	Concrete
WIPE 243WP10	243	4	Arsenic	0.357	Floor	Concrete
WIPE 243WP10	243	4	Nickel	7.58	Floor	Concrete
WIPE 243WP09	243	4	Chromium	0.314	Wall	Concrete Block
WIPE BNKWP04	244	Bunker - left	RDX	0.276	Floor	Concrete
WIPE BNKWP01	245	Bunker - right	RDX	0.807	Floor	Concrete
WIPE BNKWP01B	245	Bunker - right	2.4-Dinitrotoluene	0.67	Floor	Concrete
WIPE BNKWP01B	245	Bunker - right	RDX	0.656	Floor	Concrete
WIPE 292WP37	292	106	Barium	1.89	Floor	Concrete
WIPE 292WP37	292	106	Chromium	0.545	Floor	Concrete
WIPE 292WP36	292	106	PCB 1260	0.0241	Wall	Concrete Block
WIPE 292WP32	292	125	Mercury	0.384	Floor Drain	
WIPE 292WP30	292	125	Chromium	0.547	Fume Hood	
WIPE 292WP31	292	125	Benzo [K] Fluoranthene	0.23	Fume Hood	
WIPE 292WP31	292	125	Mercury	0.412	Fume Hood	
WIPE 292WP31	292	125	Nickel	5.45	Fume Hood	
WIPE 292WP31B	292	125	Nickel	7.83	Fume Hood	
WIPE 292WP26	292	125	Cadmium	0.617	Wall	Concrete Block
WIPE 292WP26	292	125	Chromium	0.235	Wall	Concrete Block
WIPE 292WP39	292	132	Barium	1.29	Floor	Concrete
WIPE 292WP40	292	132	Antimony	8.77	Floor Drain	
WIPE 292WP40	292	132	Arsenic	0.169	Floor Drain	
WIPE 292WP40	292	132	Barium	5.03	Floor Drain	
WIPE 292WP40	292	132	Cadmium	0.916	Floor Drain	
WIPE 292WP40	292	132	Silver	4.43	Floor Drain	
WIPE 292WP38	292	132	Barium	6.06	Wall	Concrete Block
WIPE 292WP38	292	132	Chromium	0.917	Wall	Concrete Block
WIPE 292WP38	292	132	Methoxychlor	0.0226	Wall	Concrete Block
WIPE 292WP13	292	133	Barium	1.87	Floor	Tile
WIPE 292WP13	292	133	Cadmium	1.41	Floor	Tile
WIPE 292WP24	292	137	Barium	1.41	Floor	Tile
WIPE 292WP24	292	137	Cadmium	0.811	Floor	Tile
WIPE 292WP24	292	137	Dieldrin	0.0058	Floor	Tile
WIPE 292WP02	292	138	Barium	1.12	Floor	Tile
WIPE 292WP53	292	205	Barium	5.52	Wall	Concrete Block

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 292WP53	292	205	Chromium	0.268	Wall	Concrete Block
WIPE 292WP60	292	209	Chromium	0.392	Floor	Tile
WIPE 292WP56	292	226	Barium	1.88	Floor	Tile
WIPE 292WP51	292	227	Chromium	0.299	Floor	Tile
WIPE 292WP52	292	228	Barium	1.61	Exhaust Vent	
WIPE 292WP71	292	235	Chromium	0.667	Fume Hood	
WIPE 292WP72	292	235	Chromium	0.412	Fume Hood	
WIPE 292WP41	292	244	Benzo [A] Anthracene	0.16	Wall	Concrete Block
WIPE 292WP41	292	244	Benzo [K] Fluoranthene	0.13	Wall	Concrete Block
WIPE 292WP41	292	244	Chrysene	0.16	Wall	Concrete Block
WIPE 292WP46	292	245	Antimony	2.4	Fume Hood	
WIPE 292WP83	292	250	Barium	6.46	Floor	Tile
WIPE 292WP83	292	250	Chromium	0.751	Floor	Tile
WIPE 292WP83B	292	250	Arsenic	0.442	Floor	Tile
WIPE 292WP83B	292	250	Barium	4.06	Floor	Tile
WIPE 292WP83B	292	250	Chromium	0.661	Floor	Tile
WIPE 292WP83B	292	250	Vanadium	13.1	Floor	Tile
WIPE 292WP82	292	250	Benzo [A] Anthracene	0.05	Wall	Concrete Block
WIPE 292WP82	292	250	Chrysene	0.06	Wall	Concrete Block
WIPE 311WP02	311	1	Barium	9	Floor	Concrete
WIPE 311WP01	311	1	Arsenic	0.13	Wall	Painted CB
WIPE 311WP11	311	3	Barium	1.45	Floor	Concrete
WIPE 311WP11	311	3	Cadmium	1.66	Floor	Concrete
WIPE 311WP13	311	4	Arsenic	0.179	Floor	Concrete
WIPE 311WP13	311	4	Beryllium	0.0236	Floor	Concrete
WIPE 311WP13	311	4	Nickel	7.57	Floor	Concrete
WIPE 311WP13B	311	4	Antimony	1.06	Floor	Concrete
WIPE 311WP13B	311	4	Arsenic	0.257	Floor	Concrete
WIPE 311WP13B	311	4	Barium	10.8	Floor	Concrete
WIPE 311WP15	311	5	Antimony	1.41	Floor	Concrete
WIPE 311WP15	311	5	Arsenic	0.182	Floor	Concrete
WIPE 311WP15	311	5	Barium	8.85	Floor	Concrete
WIPE 311WP15	311	5	Beryllium	0.0257	Floor	Concrete
WIPE 311WP15	311	5	Dieldrin	0.00629	Floor	Concrete
WIPE 311WP15	311	5	Nickel	9.77	Floor	Concrete
WIPE 311WP14	311	5	Arsenic	0.093	Wall	Concrete Block
WIPE 311WP14	311	5	Cadmium	1.02	Wall	Concrete Block
WIPE 311WP14	311	5	Chromium	0.882	Wall	Concrete Block

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 311WP14	311	5	Chrysene	0.03	Wall	Concrete Block
WIPE 311WP17	311	6	Antimony	1.25	Floor	Concrete
WIPE 311WP17	311	6	Arsenic	0.189	Floor	Concrete
WIPE 311WP17	311	6	Barium	8.73	Floor	Concrete
WIPE 311WP17	311	6	Cadmium	2.18	Floor	Concrete
WIPE 311WP17	311	6	Dieldrin	0.0234	Floor	Concrete
WIPE 311WP17	311	6	Nickel	11.4	Floor	Concrete
WIPE 311WP16	311	6	Barium	4.69	Wall	Concrete Block
WIPE 311WP19	311	7	Aldrin	0.00814	Floor	Concrete
WIPE 311WP19	311	7	Barium	9.82	Floor	Concrete
WIPE 311WP19	311	7	Benzo [A] Anthracene	0.38	Floor	Concrete
WIPE 311WP19	311	7	Beryllium	0.0246	Floor	Concrete
WIPE 311WP19	311	7	Cadmium	2.02	Floor	Concrete
WIPE 311WP19	311	7	Chrysene	0.36	Floor	Concrete
WIPE 311WP19	311	7	Heptachlor	0.0235	Floor	Concrete
WIPE 311WP19	311	7	Heptachlor Epoxide	0.0538	Floor	Concrete
WIPE 311WP19	311	7	Nickel	5.16	Floor	Concrete
WIPE 311WP18	311	7	Barium	1.32	Wall	Concrete Block
WIPE 311WP18	311	7	Chromium	0.787	Wall	Concrete Block
WIPE 311WP21	311	8	Barium	8.51	Floor	Concrete
WIPE 311WP21	311	8	Cadmium	2.07	Floor	Concrete
WIPE 311WP21	311	8	Dieldrin	0.0107	Floor	Concrete
WIPE 311WP21	311	8	Nickel	12.6	Floor	Concrete
WIPE 311WP20	311	8	Chromium	0.616	Wall	Concrete Block
WIPE 311WP07	311	10	Chromium	0.243	Floor	Concrete
WIPE 311WP09	311	10	Antimony	0.982	Floor	Concrete
WIPE 311WP09	311	10	Chromium	0.273	Floor	Concrete
WIPE 311WP08	311	10	Antimony	0.678	Wall	Metal
WIPE 311WP08	311	10	bis (2-Ethylhexyl) Phthalate	53	Wall	Metal
WIPE 311WP04	311	11	Arsenic	0.096	Floor	Metal
WIPE 311WP04	311	11	Barium	2.44	Floor	Metal
WIPE 311WP05	311	11	Barium	4.34	Floor	Metal
WIPE 311WP03	311	11	Arsenic	0.224	Wall	Painted CB
WIPE 311WP03	311	11	Cadmium	1.62	Wall	Painted CB
WIPE 311WP24	311	12	Arsenic	0.148	Floor	Concrete
WIPE 311WP24	311	12	Barium	4.57	Floor	Concrete
WIPE 311WP24	311	12	Cadmium	0.793	Floor	Concrete
WIPE 311WP24	311	12	Dieldrin	0.026	Floor	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 311WP24	311	12	Nickel	9.31	Floor	Concrete
WIPE 311WP25	311	12	Barium	5.26	Floor	Concrete
WIPE 311WP25	311	12	Nickel	7.66	Floor	Concrete
WIPE 311WP26	311	12	Barium	3.06	Floor	Concrete
WIPE 311WP26B	311	12	Barium	1.89	Floor	Concrete
WIPE 311WP26B	311	12	Dieldrin	0.0131	Floor	Concrete
WIPE 311WP26B	311	12	Nickel	10.4	Floor	Concrete
WIPE 311WP23	311	12	Arsenic	0.123	Wall	Brick
WIPE 311WP23	311	12	Barium	13.3	Wall	Brick
WIPE 311WP23	311	12	Nickel	5.64	Wall	Brick
WIPE 311WP28	311	14	Barium	5.81	Floor	Concrete
WIPE 311WP28	311	14	Cadmium	0.819	Floor	Concrete
WIPE 311WP28	311	14	Nickel	7.78	Floor	Concrete
WIPE 311WP28	311	14	Vanadium	25.9	Floor	Concrete
WIPE 311WP27	311	14	Barium	2.66	Wall	Concrete Block
WIPE 311WP31	311	19	Barium	2.51	Floor	Concrete
WIPE 311WP32	311	19	Arsenic	0.152	Floor	Concrete
WIPE 311WP32	311	19	Barium	4.01	Floor	Concrete
WIPE 311WP32	311	19	Beryllium	0.0266	Floor	Concrete
WIPE 311WP30	311	19	Barium	1.58	Wall	Brick
WIPE 311WP30	311	19	Chromium	0.77	Wall	Brick
WIPE 311WP34	311	20	Arsenic	0.232	Floor	Concrete
WIPE 311WP34	311	20	Barium	11.8	Floor	Concrete
WIPE 311WP34	311	20	Nickel	9.39	Floor	Concrete
WIPE 311WP33	311	20	Barium	7.82	Wall	Brick
WIPE 311WP33	311	20	Chromium	0.373	Wall	Brick
WIPE 311WP36	311	21	Barium	6.89	Floor	Concrete
WIPE 311WP36	311	21	Cadmium	0.694	Floor	Concrete
WIPE 311WP36	311	21	Nickel	5.81	Floor	Concrete
WIPE 311WP37	311	22	bis (2-Ethylhexyl) Phthalate	34	Floor	Concrete
WIPE 311WP37	311	22	Cadmium	0.699	Floor	Concrete
WIPE 311WP37	311	22	Nickel	6.06	Floor	Concrete
WIPE 311WP38	311	23	Arsenic	0.198	Floor	Concrete
WIPE 311WP38	311	23	Barium	10.7	Floor	Concrete
WIPE 311WP38	311	23	Cadmium	1.48	Floor	Concrete
WIPE 311WP38	311	23	Nickel	17.1	Floor	Concrete
WIPE 311WP42	311	24	Antimony	1.34	Floor	Metal
WIPE 311WP42	311	24	Chromium	0.538	Floor	Metal

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 311WP40	311	25	Antimony	1.12	Floor	Metal
WIPE 311WP40	311	25	Barium	2.8	Floor	Metal
WIPE 311WP29	311	26	Antimony	4.92	Floor	Metal
WIPE 311WP29	311	26	Arsenic	0.156	Floor	Metal
WIPE 311WP29	311	26	Barium	11.4	Floor	Metal
WIPE 311WP29	311	26	Cadmium	1.14	Floor	Metal
WIPE 311WP29	311	26	Nickel	9.46	Floor	Metal
WIPE 311WP71	311	26	Barium	3.62	Floor	Metal
WIPE 311WP70	311	26	Chromium	0.433	Wall	Dry Wall
WIPE 311WP67	311	27	Arsenic	0.144	Floor	Concrete
WIPE 311WP67	311	27	Barium	8.77	Floor	Concrete
WIPE 311WP68	311	28	Arsenic	0.159	Floor	Concrete
WIPE 311WP68	311	28	Barium	7.96	Floor	Concrete
WIPE 311WP68	311	28	Beryllium	0.0224	Floor	Concrete
WIPE 311WP68	311	28	Cadmium	0.59	Floor	Concrete
WIPE 311WP68	311	28	Nickel	4.67	Floor	Concrete
WIPE 311WP69	311	28	Barium	4.41	Floor	Concrete
WIPE 311WP35	311	30	Antimony	0.653	Floor	Metal
WIPE 311WP35	311	30	Arsenic	0.159	Floor	Metal
WIPE 311WP35	311	30	Beryllium	0.0154	Floor	Metal
WIPE 311WP35	311	30	Cadmium	0.656	Floor	Metal
WIPE 311WP58	311	31	Barium	1.57	Floor	Metal
WIPE 311WP57	311	31	Chromium	0.606	Wall	Dry Wall
WIPE 311WP73	311	32	Barium	2.62	Floor	Metal
WIPE 311WP73	311	32	Cadmium	0.641	Floor	Metal
WIPE 311WP73	311	32	Heptachlor Epoxide	0.0101	Floor	Metal
WIPE 311WP75	311	33	Barium	6.84	Floor	Wood
WIPE 311WP75	311	33	Cadmium	0.58	Floor	Wood
WIPE 311WP77	311	34	Barium	1.51	Floor	Concrete
WIPE 311WP76	311	34	Barium	1.4	Wall	Metal
WIPE 311WP76	311	34	Cadmium	1.24	Wall	Metal
WIPE 311WP76	311	34	Chromium	0.319	Wall	Metal
WIPE 311WP81	311	37	Barium	6.1	Floor	Concrete
WIPE 311WP81	311	37	Cadmium	0.961	Floor	Concrete
WIPE 311WP83	311	38	Barium	1.12	Floor	Tile
WIPE 311WP83	311	38	Chromium	0.808	Floor	Tile
WIPE 311WP85	311	39	Antimony	2.1	Floor	Tile
WIPE 311WP85	311	39	Barium	1.99	Floor	Tile

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 311WP85	311	39	Chromium	0.92	Floor	Tile
WIPE 311WP44	311	100	Methoxychlor	0.0638	Floor	Tile
WIPE 311WP46	311	102	Chromium	0.343	Floor	Tile
WIPE 311WP45	311	102	Chromium	0.43	Wall	Metal
WIPE 311WP49	311	104	Chromium	0.835	Floor	Tile
WIPE 311WP51	311	105	Barium	1.37	Floor	Tile
WIPE 311WP53	311	107	Antimony	1.83	Floor	Tile
WIPE 311WP53	311	107	Barium	1.88	Floor	Tile
WIPE 311WP53	311	107	Cadmium	0.74	Floor	Tile
WIPE 311WP54	311	107	Antimony	4.06	Fume Hood	
WIPE 311WP54	311	107	Chromium	0.257	Fume Hood	
WIPE 311WP56	311	109	Chromium	0.271	Floor	Tile
WIPE 311WP56	311	109	Methoxychlor	0.072	Floor	Tile
WIPE 311WP66	311	112	Chromium	0.255	Floor	Tile
WIPE 311WP90	311	East	Barium	12.9	I-Beam	
WIPE 311WP90	311	East	Chromium	0.276	I-Beam	
WIPE 311WP61	311	Mezzanine	Barium	1.67	Floor	Concrete
WIPE 311WP61	311	Mezzanine	Nickel	13.6	Floor	Concrete
WIPE 311WP62	311	Mezzanine	Barium	5.88	Floor	Concrete
WIPE 311WP62	311	Mezzanine	Cadmium	1.5	Floor	Concrete
WIPE 311WP87	311	West	Arsenic	0.318	I-Beam	
WIPE 311WP87	311	West	Dieldrin	0.0355	I-Beam	
WIPE 311WP87	311	West	Nickel	5.65	I-Beam	
WIPE 311WP87	311	West	RDX	0.364	I-Beam	
WIPE 311WP87	311	West	Vanadium	6.9	I-Beam	
WIPE 311WP87	311	West	Barium	8.29	I-Beam	
WIPE 311WP88	311	West Central	Arsenic	0.448	I-Beam	
WIPE 311WP88	311	West Central	Dieldrin	0.0462	I-Beam	
WIPE 311WP88	311	West Central	RDX	0.293	I-Beam	
WIPE 311WP88	311	West Central	Vanadium	9.8	I-Beam	
WIPE 311WP88	311	West Central	Barium	11	I-Beam	
WIPE 312WP45	312	1.2	Nickel	14.9	Floor	Concrete
WIPE 312WP33	312	1.3	Arsenic	0.144	Floor	Concrete
WIPE 312WP33	312	1.3	Barium	6.59	Floor	Concrete
WIPE 312WP33	312	1.3	Nickel	4.43	Floor	Concrete
WIPE 312WP33	312	1.3	RDX	0.318	Floor	Concrete
WIPE 312WP34	312	1.3	2.4-Dinitrotoluene	0.367	Floor	Concrete
WIPE 312WP34	312	1.3	Arsenic	0.267	Floor	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 312WP34	312	1.3	Barium	8	Floor	Concrete
WIPE 312WP34	312	1.3	Nickel	10.4	Floor	Concrete
WIPE 312WP34	312	1.3	RDX	1.4	Floor	Concrete
WIPE 312WP31	312	1.3	Chromium	0.26	Wall	Concrete
WIPE 312WP48	312	1.4	Chromium	0.304	Floor	Concrete
WIPE 312WP48	312	1.4	RDX	0.953	Floor	Concrete
WIPE 312WP48B	312	1.4	Chromium	0.433	Floor	Concrete
WIPE 312WP48B	312	1.4	RDX	0.83	Floor	Concrete
WIPE 312WP50	312	1.5	Chromium	0.41	Floor	Concrete
WIPE 312WP92	312	1.7	Aldrin	0.00742	Floor	Concrete
WIPE 312WP92	312	1.7	Arsenic	0.171	Floor	Concrete
WIPE 312WP92	312	1.7	Barium	3.66	Floor	Concrete
WIPE 312WP92	312	1.7	Cadmium	1.06	Floor	Concrete
WIPE 312WP92	312	1.7	Nickel	6.85	Floor	Concrete
WIPE 312WP92	312	1.7	RDX	0.322	Floor	Concrete
WIPE 312WP92B	312	1.7	Aldrin	0.00797	Floor	Concrete
WIPE 312WP92B	312	1.7	Barium	5.55	Floor	Concrete
WIPE 312WP92B	312	1.7	Nickel	5.2	Floor	Concrete
WIPE 312WP110	312	3	Barium	3.88	Floor	Concrete
WIPE 312WP110	312	3	Chromium	0.791	Floor	Concrete
WIPE 312WP111	312	3	Arsenic	0.104	Floor	Concrete
WIPE 312WP111	312	3	Barium	4.64	Floor	Concrete
WIPE 312WP111	312	3	Cadmium	1.33	Floor	Concrete
WIPE 312WP109	312	3.1	Barium	6.75	Floor	Concrete
WIPE 312WP109	312	3.1	Benzo [A] Anthracene	0.045	Floor	Concrete
WIPE 312WP109	312	3.1	Cadmium	0.83	Floor	Concrete
WIPE 312WP113	312	3.2	Arsenic	0.154	Floor	Concrete
WIPE 312WP113	312	3.2	Barium	6.99	Floor	Concrete
WIPE 312WP113	312	3.2	Cadmium	1.31	Floor	Concrete
WIPE 312WP25	312	101	Barium	1.74	Floor	Surface Removed
WIPE 312WP25	312	101	Cadmium	2.38	Floor	Surface Removed
WIPE 312WP26	312	101	Barium	1.6	Floor	Surface Removed
WIPE 312WP26	312	101	Cadmium	0.682	Floor	Surface Removed
WIPE 312WP26B	312	101	Barium	2.46	Floor	Surface Removed
WIPE 312WP26B	312	101	Cadmium	2.27	Floor	Surface Removed
WIPE 312WP26B	312	101	Chromium	0.75	Floor	Surface Removed
WIPE 312WP26B	312	101	Methoxychlor	0.0381	Floor	Surface Removed
WIPE 312WP27	312	101	Nickel	5.02	Fume Hood	

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 312WP94	312	101.1	Barium	1.26	Floor	Concrete
WIPE 312WP94	312	101.1	Nickel	7.59	Floor	Concrete
WIPE 312WP94	312	101.1	RDX	0.526	Floor	Concrete
WIPE 312WP94B	312	101.1	Chromium	0.241	Floor	Concrete
WIPE 312WP94B	312	101.1	RDX	0.471	Floor	Concrete
WIPE 312WP23	312	102	Barium	2.11	Floor	Surface Removed
WIPE 312WP23	312	102	Cadmium	1.2	Floor	Surface Removed
WIPE 312WP23	312	102	Chromium	0.667	Floor	Surface Removed
WIPE 312WP23	312	102	Mercury	0.329	Floor	Surface Removed
WIPE 312WP21	312	103	Barium	2.76	Floor	Surface Removed
WIPE 312WP16	312	105	Barium	1.86	Floor	Concrete
WIPE 312WP16	312	105	Beryllium	0.027	Floor	Concrete
WIPE 312WP16	312	105	Cadmium	0.89	Floor	Concrete
WIPE 312WP68	312	110	Cadmium	0.755	Floor	Surface Removed
WIPE 312WP68B	312	110	Cadmium	1.15	Floor	Surface Removed
WIPE 312WP63	312	111	Barium	1.74	Exhaust Vent	
WIPE 312WP63	312	111	Chromium	0.265	Exhaust Vent	
WIPE 312WP64	312	111	Barium	3.58	Exhaust Vent	
WIPE 312WP64	312	111	Cadmium	1.06	Exhaust Vent	
WIPE 312WP62	312	111	Barium	3.21	Floor	Surface Removed
WIPE 312WP66	312	111	Barium	2.13	Floor	Surface Removed
WIPE 312WP66	312	111	Chromium	0.885	Floor	Surface Removed
WIPE 312WP19	312	113	Barium	5.21	Floor	Concrete
WIPE 312WP19	312	113	Nickel	14	Floor	Concrete
WIPE 312WP30	312	114	Cadmium	2.31	Exhaust Vent	
WIPE 312WP30	312	114	Chromium	0.352	Exhaust Vent	
WIPE 312WP02	312	114	Barium	5.9	Floor	Concrete
WIPE 312WP02	312	114	Cadmium	0.985	Floor	Concrete
WIPE 312WP02	312	114	Chromium	0.836	Floor	Concrete
WIPE 312WP02B	312	114	Barium	2.85	Floor	Concrete
WIPE 312WP03	312	114	Barium	2.5	Floor	Concrete
WIPE 312WP05	312	114	Barium	3.14	Floor Drain	
WIPE 312WP06	312	114	Barium	1.28	Floor Drain	
WIPE 312WP07	312	114	Barium	5.81	Floor Drain	
WIPE 312WP08	312	114	Barium	1.32	Floor Drain	
WIPE 312WP08	312	114	Cadmium	1.05	Floor Drain	
WIPE 312WP08	312	114	Chromium	0.617	Floor Drain	
WIPE 312WP11	312	115	Barium	7.18	Floor	Surface Removed

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk
(continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 312WP12	312	115	Barium	2.15	Floor	Surface Removed
WIPE 312WP12	312	115	Chromium	0.698	Floor	Surface Removed
WIPE 312WP13	312	115	Barium	5.78	Floor Drain	
WIPE 312WP14	312	115	Barium	2.37	Floor Drain	
WIPE 312WP09	312	115	Beryllium	0.0126	Wall	Dry Wall
WIPE 312WP57	312	117	Barium	2.13	Exhaust Vent	
WIPE 312WP57	312	117	Chromium	0.827	Exhaust Vent	
WIPE 312WP55	312	117	Beryllium	0.0219	Floor	Surface Removed
WIPE 312WP55	312	117	Chromium	0.34	Floor	Surface Removed
WIPE 312WP56B	312	117	Chromium	0.271	Floor	Surface Removed
WIPE 312WP59	312	117	Nickel	9.9	Floor Drain	
WIPE 312WP60	312	117	Barium	3.56	Floor Drain	
WIPE 312WP53	312	117	Chromium	0.34	Wall	Painted CB
WIPE 312WP58	312	118	Barium	1.79	Exhaust Vent	
WIPE 312WP72	312	118	Nickel	5.77	Floor	Tile
WIPE 312WP77	312	120	Chromium	0.289	Fume Hood	
WIPE 312WP69	312	121	Benzo [A] Anthracene	0.1	Wall	Painted Concrete
WIPE 312WP69	312	121	Benzo [B] Fluoranthene	0.16	Wall	Painted Concrete
WIPE 312WP69	312	121	Benzo [K] Fluoranthene	0.15	Wall	Painted Concrete
WIPE 312WP69	312	121	Chrysene	0.08	Wall	Painted Concrete
WIPE 312WP79	312	125	Barium	1.5	Floor	Concrete
WIPE 312WP79	312	125	Chromium	0.454	Floor	Concrete
WIPE 312WP83	312	126	Barium	1.21	Floor Drain	
WIPE 312WP83	312	126	Cadmium	1.1	Floor Drain	
WIPE 312WP83	312	126	Chromium	0.405	Floor Drain	
WIPE 312WP83	312	126	Nickel	12.6	Floor Drain	
WIPE 312WP37	312	135	Antimony	4.07	Floor	Concrete
WIPE 312WP37	312	135	Cyanide	26.4	Floor	Concrete
WIPE 312WP38	312	135	Antimony	2.75	Floor	Concrete
WIPE 312WP38	312	135	Arsenic	0.155	Floor	Concrete
WIPE 312WP38	312	135	Beryllium	0.0273	Floor	Concrete
WIPE 312WP38	312	135	Cyanide	7.49	Floor	Concrete
WIPE 312WP35	312	135	Antimony	2.1	Wall	Painted Brick
WIPE 312WP35	312	135	Barium	7.38	Wall	Painted Brick
WIPE 312WP35	312	135	Cadmium	0.68	Wall	Painted Brick
WIPE 312WP36	312	135	Barium	7.53	Wall	Painted Brick
WIPE 312WP42	312	137	Cadmium	0.951	Floor	Tile
WIPE 312WP42	312	137	Chromium	0.879	Floor	Tile

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 312WP43	312	137	Antimony	2.24	Fume Hood	
WIPE 312WP43	312	137	Cadmium	1.26	Fume Hood	
WIPE 312WP41	312	137	Barium	1.19	Wall	Dry Wall
WIPE 312WP41	312	137	Chromium	0.277	Wall	Dry Wall
WIPE 312WP102	312	142	Benzo [K] Fluoranthene	0.08	Floor	Tile
WIPE 312WP101	312	142	Chromium	0.36	Wall	Dry Wall
WIPE 312WP106	312	143	Chromium	0.311	Floor	Tile
WIPE 312WP100	312	145	Chromium	0.775	Floor	Tile
WIPE 312WP100	312	145	Silver	5.3	Floor	Tile
WIPE 312WP98	312	147	Barium	5.7	Floor	Tile
WIPE 312WP98	312	147	Chromium	0.645	Floor	Tile
WIPE 312WP98B	312	147	Antimony	2.81	Floor	Tile
WIPE 312WP98B	312	147	Barium	4.02	Floor	Tile
WIPE 312WP98B	312	147	Cadmium	0.725	Floor	Tile
WIPE 312WP86	312	199	Aldrin	0.0193	I-Beam	
WIPE 312WP86	312	199	Arsenic	0.172	I-Beam	
WIPE 312WP86	312	199	Barium	8.24	I-Beam	
WIPE 312WP86	312	199	Benzo [K] Fluoranthene	0.25	I-Beam	
WIPE 312WP86	312	199	Methoxychlor	0.0784	I-Beam	
WIPE 312WP86	312	199	Nickel	11.2	I-Beam	
WIPE 312WP89	312	199.1	Chromium	0.349	Floor	Tile
WIPE 312WP89	312	199.1	Mercury	0.665	Floor	Tile
WIPE 312WP90	312	199.1	Chromium	0.391	Fume Hood	
WIPE 313WP89	313	0.1	Barium	1.91	Equipment	
WIPE 313WP89	313	0.1	Chromium	0.572	Equipment	
WIPE 313WP90	313	0.1	Chromium	0.299	Equipment	
WIPE 313WP91	313	0.2	Barium	6.58	Floor	Concrete
WIPE 313WP92	313	0.2	Barium	2.01	Floor	Concrete
WIPE 313WP109	313	0.2	Arsenic	0.133	Wall	Concrete
WIPE 313WP110	313	0.2	Antimony	1.21	Wall	Concrete
WIPE 313WP110	313	0.2	Barium	5.33	Wall	Concrete
WIPE 313WP110	313	0.2	Chromium	0.524	Wall	Concrete
WIPE 313WP66	313	0.3	Arsenic	0.402	Floor	Concrete
WIPE 313WP66	313	0.3	Barium	7.35	Floor	Concrete
WIPE 313WP67	313	0.3	Barium	3.69	Floor	Concrete
WIPE 313WP68	313	0.3	Arsenic	0.129	Floor	Concrete
WIPE 313WP68	313	0.3	Barium	5.56	Floor	Concrete
WIPE 313WP62	313	0.3	Barium	2.43	Wall	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 313WP63	313	0.3	Chromium	0.298	Wall	Concrete
WIPE 313WP64	313	0.3	Arsenic	0.0733	Wall	Concrete
WIPE 313WP64	313	0.3	Barium	1.6	Wall	Concrete
WIPE 313WP64	313	0.3	Chromium	0.405	Wall	Concrete
WIPE 313WP114	313	0.4	Chromium	0.266	Floor	Concrete
WIPE 313WP85	313	0.5	Barium	1.95	Filter	
WIPE 313WP85	313	0.5	Chromium	0.623	Filter	
WIPE 313WP86	313	0.5	Chromium	0.357	Filter	
WIPE 313WP87B	313	0.5	RDX	1.24	Filter	
WIPE 313WP70	313	0.5	Arsenic	0.089	Wall	Concrete
WIPE 313WP70	313	0.5	Barium	1.67	Wall	Concrete
WIPE 313WP70	313	0.5	Chromium	0.374	Wall	Concrete
WIPE 313WP106	313	0.6	Barium	11.2	Floor	Concrete
WIPE 313WP106	313	0.6	Chromium	0.826	Floor	Concrete
WIPE 313WP106	313	0.6	RDX	0.585	Floor	Concrete
WIPE 313WP107	313	0.6	2.4-Dinitrotoluene	0.589	Floor	Concrete
WIPE 313WP107	313	0.6	RDX	1.44	Floor	Concrete
WIPE 313WP108	313	0.6	RDX	0.913	Floor	Concrete
WIPE 313WP104	313	0.6	Antimony	2.25	Wall	Concrete Block
WIPE 313WP104	313	0.6	Barium	3.78	Wall	Concrete Block
WIPE 313WP101	313	0.7	Antimony	9.69	Floor	Concrete
WIPE 313WP101	313	0.7	Arsenic	0.431	Floor	Concrete
WIPE 313WP101	313	0.7	Barium	12.4	Floor	Concrete
WIPE 313WP101	313	0.7	Nickel	4.55	Floor	Concrete
WIPE 313WP102	313	0.7	2.4-Dinitrotoluene	0.83	Floor	Concrete
WIPE 313WP102	313	0.7	RDX	1.22	Floor	Concrete
WIPE 313WP103	313	0.7	RDX	0.977	Floor	Concrete
WIPE 313WP100	313	0.7	RDX	0.494	Wall	Concrete
WIPE 313WP99	313	0.7	Barium	10.5	Wall	Concrete
WIPE 313WP99	313	0.7	Chromium	0.272	Wall	Concrete
WIPE 313WP99	313	0.7	RDX	0.641	Wall	Concrete
WIPE 313WP96	313	0.8	Barium	3.23	Floor	Concrete
WIPE 313WP97	313	0.8	RDX	0.304	Floor	Concrete
WIPE 313WP93	313	0.8	Antimony	1.03	Wall	Painted Metal
WIPE 313WP93	313	0.8	Barium	4.88	Wall	Painted Metal
WIPE 313WP93	313	0.8	RDX	0.363	Wall	Painted Metal
WIPE 313WP94	313	0.8	RDX	0.293	Wall	Painted Metal
WIPE 313WP112	313	0.9	Barium	13.7	Floor	Concrete

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 313WP112	313	0.9	Chromium	0.556	Floor	Concrete
WIPE 313WP16	313	1.1	Chromium	0.504	Floor	Concrete
WIPE 313WP17	313	1.1	Chromium	0.518	Floor	Concrete
WIPE 313WP14	313	1.1	Chromium	0.266	Wall	Painted Brick
WIPE 313WP15	313	1.1	Chromium	0.269	Wall	Painted Brick
WIPE 313WP42	313	1.2	Chromium	0.533	Wall	Painted Brick
WIPE 313WP07	313	1.3	Barium	1.13	Floor	Concrete
WIPE 313WP07	313	1.3	Chromium	0.671	Floor	Concrete
WIPE 313WP13	313	1.3	Barium	1.12	Fume Hood	
WIPE 313WP09	313	1.4	Barium	6.94	Floor	Painted Concrete
WIPE 313WP11	313	1.4	Barium	5.76	Floor	Painted Concrete
WIPE 313WP11	313	1.4	Chromium	0.231	Floor	Painted Concrete
WIPE 313WP11	313	1.4	Nickel	6.17	Floor	Painted Concrete
WIPE 313WP25	313	1.5	Arsenic	0.294	Floor	Painted Concrete
WIPE 313WP25	313	1.5	Barium	10.6	Floor	Painted Concrete
WIPE 313WP25	313	1.5	Cadmium	1.52	Floor	Painted Concrete
WIPE 313WP26	313	1.5	Barium	2.84	Floor	Painted Concrete
WIPE 313WP26	313	1.5	Benzo [A] Anthracene	0.16	Floor	Painted Concrete
WIPE 313WP26	313	1.5	Benzo [K] Fluoranthene	0.13	Floor	Painted Concrete
WIPE 313WP26	313	1.5	Chrysene	0.19	Floor	Painted Concrete
WIPE 313WP26	313	1.5	Mercury	0.379	Floor	Painted Concrete
WIPE 313WP26	313	1.5	Nickel	8.81	Floor	Painted Concrete
WIPE 313WP27	313	1.5	Barium	6.96	Floor	Painted Concrete
WIPE 313WP27	313	1.5	Nickel	8.2	Floor	Painted Concrete
WIPE 313WP160	313	1.5	Barium	4.76	I-Beam	
WIPE 313WP160	313	1.5	Benzo [A] Anthracene	0.16	I-Beam	
WIPE 313WP160	313	1.5	Mercury	0.422	I-Beam	
WIPE 313WP160B	313	1.5	Barium	5.64	I-Beam	
WIPE 313WP160B	313	1.5	Mercury	0.44	I-Beam	
WIPE 313WP22	313	1.5	Chromium	0.532	Wall	Painted Brick
WIPE 313WP45	313	119	Chromium	0.295	Floor	Tile
WIPE 313WP46	313	119	Chromium	0.683	Floor	Tile
WIPE 313WP55	313	125	Barium	1.39	Floor	Painted Concrete
WIPE 313WP55	313	125	Chromium	0.451	Floor	Painted Concrete
WIPE 313WP58	313	126	Arsenic	0.264	Floor	Tile
WIPE 313WP58	313	126	Nickel	10.1	Floor	Tile
WIPE 313WP59	313	126	Chromium	0.258	Fume Hood	
WIPE 313WP57	313	126	Chromium	0.231	Wall	Painted CB

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-9
MTL Compounds Below Commercial and Above Residential Levels of No Significant Risk (continued)

Site ID	Building	Room	Compound	Result (mg/m^2)	Surface	Material
WIPE 313WP61	313	129	Chromium	0.231	Floor	Tile
WIPE 313WP51	313	138	Arsenic	0.184	Floor	Concrete
WIPE 313WP52	313	138	Antimony	0.676	Floor	Concrete
WIPE 313WP53	313	138	Arsenic	0.202	Floor	Concrete
WIPE 313WP53	313	138	Barium	16.4	Floor	Concrete
WIPE 313WP48	313	138	Nickel	5.89	Wall	Painted Brick
WIPE 313WP49	313	138	Nickel	5.19	Wall	Painted Brick
WIPE 313WP32	313	152	Chromium	0.618	Floor	Tile
WIPE 313WP32	313	152	Nickel	4.33	Floor	Tile
WIPE 313WP38	313	153	Barium	3.66	Floor	Tile
WIPE 313WP02	313	194	Barium	2.51	Floor	Tile
WIPE 313WP18	313	195	Barium	6.74	Floor	Painted Concrete
WIPE 313WP18	313	195	Nickel	5.24	Floor	Painted Concrete
WIPE 313WP12	313	195	Benzo [A] Anthracene	0.12	Fume Hood	
WIPE 313WP12	313	195	Chrysene	0.14	Fume Hood	
WIPE 313WP20B	313	196	Chrysene	0.06	Wall	Brick
WIPE 313WP143	313	250	Barium	15.2	Wall	Painted CB
WIPE 313WP137	313	253	Barium	16.9	Wall	Concrete Block
WIPE 313WP34	313	138A	Barium	2.21	Floor	Tile
WIPE 313WP34	313	138A	Nickel	5.29	Floor	Tile
WIPE 313WP34B	313	138A	Barium	2.04	Floor	Tile

Note: The compounds presented in Table A-9
are in addition to the compounds presented in Table A-8

Table A-10

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Building Summary

Surface Type	Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall
Contamination Type	M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P
Building												
36	2080		1120		4960				240			
37	12375			11905	4360			1375				145
39		2110		4335	1145			800	320	960	8900	2420
43												
60					8000		300					
97	1120											
111				3750								
117				2500								
118												
131				1315								1155
243				1250	1250				1000			
245						1500						
292					1910			1035	1190	800		
311	8750			21135	1000	500		7795		15000	3000	
312				3885		1540						
313		27255		11305		4185	6335	5505		2210		
Total	24325	29365	1120	61380	22625	7725	6635	16510	2750	18970	11900	3720

Grand Total
298940

M/B/P - Metals/BNAs/Pesticides
Expl - Explosives

Table A-10
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Building Summary (continued)

Surface Type	Metal		Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type	M/B/P	PCB	M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building															
36			6790												
37			540					1				4			
39	80	50	14705	260			1	2		10			8300		2
43															2
60															
97			7980							1					
111					3750										
117															
118					170										
131			50					1							
243								1	1						
245															
292			26895	990			2		1	4					
311	11340		5090			500				1	3		48240		
312			4625									1	28370		20
313	1920		6180							4	1				
Total	13340	50	72855	1250	3920	500	3	5	2	20	4	5	84910 & 14 area	1 area	24

Grand Total
298940

Outlined totals above do not represent areas they represent the number of items

M/B/P - Metals/BNAs/Pesticides
Expl - Explosives

Table A-11

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Building Summary

Surface Type	Brick	Painted Brick	Concrete			Concrete Block		Painted Concrete Block	Dry Wall	Metal	Tile
Contamination Type	M/B/P	M/B/P	M/B/P	Expl	PCB	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P
Building											
36					3600	2700		2100			
37	2300		1550								
39			440			1220		2550	2070		3595
60											
97						490					1000
243						1000					
244				1500							
292						2250	900				
311										2225	
312				510					1100		
313	500	500	1450			1200		1280			
Total	2800	500	3440	2010	3600	8860	900	5930	3170	2225	4595

Total Residential Scenario[1]
336970

[1] - The total area requiring remediation for the residential scenario is the sum of Tables A-10 and A-11

Note: Only areas from Buildings 37, 131, and 313 are included in the mixed scenario

M/B/P - Metals/BNAs/Pesticides

Expl - Explosives

Table A-11

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Building Summary (continued)

Surface Type	Exhaust Vent	Floor Drain	Fume Hood	I-Beam	Areas Decontaminated for Radiological Contamination	
Contamination Type	M/B/P	M/B/P	M/B/P	M/B/P	area (M/B/P)	items (M/B/P)
Building						
36						
37						
39	1		7		780	2
60		1				
97	1		3			
243						
244						
292		1	3			
311			1	1		
312			1		3055	
313			2			
Total	2	2	17	1	3835	2

Total Residential Scenario[1]
336970

Outlined totals above do not represent areas they represent the number of items

[1] - The total area requiring remediation for the residential scenario is the sum of Tables A-10 and A-11

Note: Only areas from Buildings 37, 131, and 313 are included in the mixed scenario

M/B/P - Metals/BNAs/Pesticides

Expl - Explosives

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
36	0.1	Floor					2880									
36	0.1	Wall			1120											
36	0.2	Floor					1920									
36	0.2	Wall	2080													
36	0.3	Floor/Wall									240					
36	0.4	Wall					160									
36	102	Floor														
36	Cafeteria	Floor														
37	103	Floor					240									
37	104	Floor				385										
37	106	Floor				480										
37	107	Floor					400									
37	108	Floor					300									
37	110	Wall								1075						
37	111	Floor					260									
37	113	Floor				440										
37	115	Floor					215									
37	116	Floor				600										
37	121	Floor				200										
37	127	Floor														
37	128	Floor														
37	201	Wall												145		
37	113A	Floor				300										
37	Auto Shop	Floor				5450										
37	Auto Shop	Floor Drain														
37	Auto Shop	I-Beam														
37	Auto Shop	Wall	6650													
37	Bat Storage	Floor				180										
37	Bat Storage	Wall								300						
37	Ind Eq Shop	Floor					2945									
37	Ind Eq Shop	Wall	3200													
37	Metal Shop	Floor				1870										
37	Metal Shop	I-Beam														
37	Metal Shop	Wall	2525													
37	P/E Stor.	Floor				2000										

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
36	0.1	Floor													
36	0.1	Wall													
36	0.2	Floor													
36	0.2	Wall													
36	0.3	Floor/Wall													
36	0.4	Wall													
36	102	Floor	3190												
36	Cafeteria	Floor	3600												
37	103	Floor													
37	104	Floor													
37	106	Floor													
37	107	Floor													
37	108	Floor													
37	110	Wall													
37	111	Floor													
37	113	Floor													
37	115	Floor													
37	116	Floor													
37	121	Floor													
37	127	Floor	130												
37	128	Floor	410												
37	201	Wall													
37	113A	Floor													
37	Auto Shop	Floor													
37	Auto Shop	Floor Drain						1							
37	Auto Shop	I-Beam										2			
37	Auto Shop	Wall													
37	Bat Storage	Floor													
37	Bat Storage	Wall													
37	Ind Eq Shop	Floor													
37	Ind Eq Shop	Wall													
37	Metal Shop	Floor													
37	Metal Shop	I-Beam										2			
37	Metal Shop	Wall													
37	P/E Stor.	Floor													

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
39	104	Floor														
39	108	Floor														
39	140	Floor														
39	140	Fume Hood														
39	141	Exhaust Vent														
39	142	Floor														
39	144	Floor														
39	145	Floor														
39	153	Floor														
39	153	Wall												720		
39	156	Wall											800			
39	159	Floor														
39	161	Floor														
39	162	Floor				400										
39	162	Wall										960				
39	163	Floor					1145									
39	164	Floor														
39	165	Floor														
39	165	Wall											530			
39	171	Floor				580										
39	206	Floor														
39	206	Fume Hood														
39	206	Wall											1000			
39	207	Floor														
39	227	Floor														
39	227	Wall											1125			
39	243	Floor				515										
39	243	Wall								800						
39	244	Floor				420										
39	247	Floor														
39	248	Floor														
39	301	Wall		2110												
39	331	Floor														
39	331	Fume Hood														

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
39	104	Floor	385												
39	108	Floor											1150		
39	140	Floor	160												
39	140	Fume Hood								1					
39	141	Exhaust Vent					1								
39	142	Floor											90		
39	144	Floor	255												
39	145	Floor											440		
39	153	Floor	175												
39	153	Wall													
39	156	Wall													
39	159	Floor	325												
39	161	Floor	110												
39	162	Floor													
39	162	Wall													
39	163	Floor													
39	164	Floor	400												
39	165	Floor	120												
39	165	Wall													
39	171	Floor													
39	206	Floor	485												
39	206	Fume Hood								1					
39	206	Wall													
39	207	Floor	490												
39	227	Floor	1680												
39	227	Wall													
39	243	Floor													
39	243	Wall													
39	244	Floor													
39	247	Floor											880		
39	248	Floor											450		
39	301	Wall													
39	331	Floor	510												
39	331	Fume Hood								1					

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
39	331	Wall											840			
39	403	Floor														
39	419	Floor														
39	431	Floor														
39	450	Floor														
39	501	Wall														
39	503	Floor														
39	505	Floor														
39	509	Floor														
39	509	Fume Hood														
39	509	Wall											300			
39	510	Floor														
39	512	Floor														
39	512	Fume Hood														
39	512	Wall														
39	513	Wall														
39	514	Floor														
39	514	Fume Hood														
39	514	Wall														
39	515	Floor														
39	515	Wall												1700		
39	521	Floor														
39	521	Fume Hood														
39	521	Wall											1020			
39	529	Wall											450			
39	531	Fume Hood														
39	532	Floor														
39	537	Floor														
39	537	Wall											1200			
39	538	Floor														
39	538	Floor Drain														
39	538	Fume Hood														
39	538	Wall											1035			
39	101A	Floor														
39	101B	Floor				1195										

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
39	331	Wall													
39	403	Floor	1230												
39	419	Floor	110												
39	431	Floor	1085												
39	450	Floor	190												
39	501	Wall											975		
39	503	Floor											345		
39	505	Floor	270												
39	509	Floor	65												
39	509	Fume Hood								1					
39	509	Wall													
39	510	Floor	65												
39	512	Floor											180		
39	512	Fume Hood													1
39	512	Wall											670		
39	513	Wall											450		
39	514	Floor											180		
39	514	Fume Hood													1
39	514	Wall											450		
39	515	Floor	1735												
39	515	Wall													
39	521	Floor	1765												
39	521	Fume Hood								2					
39	521	Wall													
39	529	Wall													
39	531	Fume Hood								1					
39	532	Floor	725												
39	537	Floor	590												
39	537	Wall													
39	538	Floor	455												
39	538	Floor Drain						1							
39	538	Fume Hood								2					
39	538	Wall													
39	101A	Floor											1380		
39	101B	Floor													

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
39	107A	Floor														
39	107B	Floor														
39	155B	Floor														
39	155B	Wall														
39	201/202	Floor				685										
39	201/202	Floor Drain														
39	243A	Floor				540										
39	303A	Floor														
39	333A	Floor														
39	403A	Floor														
39	403A	Fume Hood														
39	413A	Floor														
39	501A	Floor														
39	501A	Wall											600			
39	D	Floor														
39	E	Floor													80	
39	E	Wall									320					
39	F	Floor														50
43	Central	Floor														
43	Central	I-Beam														
43	Central	Wall														
43	DU Cage	Floor/Wall														
43	Mach. Area	Floor														
43	Mach. Area	Wall														
43	Scale Rm.	Floor														
43	Sto. Rm.	Floor														
43	Sto. Rm.	Wall														
60	105.1	Floor					4000									
60	105.3	Floor					4000									
60	106	Floor							300							
97	1	Floor														
97	143	Floor														
97	143	Fume Hood														
97	144	Floor														
97	146	Floor														

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
39	107A	Floor	350												
39	107B	Floor	195												
39	155B	Floor											260		
39	155B	Wall											400		
39	201/202	Floor													
39	201/202	Floor Drain						1							
39	243A	Floor													
39	303A	Floor	190												
39	333A	Floor	85												
39	403A	Floor	80												
39	403A	Fume Hood								1					
39	413A	Floor	100												
39	501A	Floor	325												
39	501A	Wall													
39	D	Floor		260											
39	E	Floor													
39	E	Wall													
39	F	Floor													
43	Central	Floor											1		
43	Central	I-Beam													2
43	Central	Wall												1	
43	DU Cage	Floor/Wall											1		
43	Mach. Area	Floor											1		
43	Mach. Area	Wall											1		
43	Scale Rm.	Floor											1		
43	Sto. Rm.	Floor											1		
43	Sto. Rm.	Wall											1		
60	105.1	Floor													
60	105.3	Floor													
60	106	Floor													
97	1	Floor	1750												
97	143	Floor	1710												
97	143	Fume Hood								1					
97	144	Floor	1515												
97	146	Floor	1560												

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
97	2 (lab)	Floor														
97	2 (mach.)	Wall	1120													
111	0.1	Floor				3750										
111	3.1	Floor														
117	0.1	Floor				2500										
118	1.1	Floor														
118	1.2	Floor														
131	2	Floor				625										
131	3	Floor				360										
131	39	Floor				330										
131	39	Floor Drain														
131	152	Floor														
131	152	Wall												1155		
243	1	Floor				625										
243	1	Floor Drain														
243	2	Floor					625									
243	2	Floor Drain														
243	2	Wall									1000					
243	3	Floor					625									
243	4	Floor				625										
245	Bunker - right	Floor						1500								
292	106	Floor					955									
292	119	Floor														
292	120	Floor														
292	120	Fume Hood														
292	121	Floor														
292	122	Floor														
292	125	Floor														
292	125	Fume Hood														
292	128	Floor														
292	128	Fume Hood														
292	132	Floor					955									
292	132	Floor Drain														
292	132	Wall									1190					

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
97	2 (lab)	Floor	1445												
97	2 (mach.)	Wall													
111	0.1	Floor													
111	3.1	Floor			3750										
117	0.1	Floor													
118	1.1	Floor			50										
118	1.2	Floor			120										
131	2	Floor													
131	3	Floor													
131	39	Floor													
131	39	Floor Drain						1							
131	152	Floor	50												
131	152	Wall													
243	1	Floor													
243	1	Floor Drain						1							
243	2	Floor													
243	2	Floor Drain							1						
243	2	Wall													
243	3	Floor													
243	4	Floor													
245	Bunker - right	Floor													
292	106	Floor													
292	119	Floor	750												
292	120	Floor	935												
292	120	Fume Hood								1					
292	121	Floor	1250												
292	122	Floor	1250												
292	125	Floor	2950												
292	125	Fume Hood								2					
292	128	Floor		250											
292	128	Fume Hood								1					
292	132	Floor													
292	132	Floor Drain							1						
292	132	Wall													

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
292	133	Floor														
292	134	Floor														
292	135	Floor														
292	136	Floor														
292	137	Floor														
292	138	Floor														
292	205	Floor														
292	206	Wall										800				
292	209	Floor														
292	212	Floor														
292	213	Floor														
292	226	Floor														
292	227	Floor														
292	228	Exhaust Vent														
292	233	Floor														
292	235	Floor														
292	236	Floor														
292	237	Floor														
292	239	Floor														
292	243	Floor														
292	244	Floor														
292	244	Wall								1035						
292	247	Floor														
292	250	Floor														
311	1	Floor				3125										
311	1	Wall										15000				
311	3	Floor				1000										
311	4	Floor				625										
311	5	Floor				625										
311	5	Wall								1200						
311	6	Floor				625										
311	6	Wall								920						
311	7	Floor				500										
311	7	Wall								920						

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
292	133	Floor		740											
292	134	Floor	480												
292	135	Floor	610												
292	136	Floor	610												
292	137	Floor	610												
292	138	Floor	300												
292	205	Floor	1840												
292	206	Wall													
292	209	Floor	960												
292	212	Floor	1110												
292	213	Floor	1290												
292	226	Floor	1790												
292	227	Floor	830												
292	228	Exhaust Vent					2								
292	233	Floor	705												
292	235	Floor	1700												
292	236	Floor	860												
292	237	Floor	1340												
292	239	Floor	910												
292	243	Floor	660												
292	244	Floor	2440												
292	244	Wall													
292	247	Floor	460												
292	250	Floor	255												
311	1	Floor													
311	1	Wall													
311	3	Floor													
311	4	Floor													
311	5	Floor													
311	5	Wall													
311	6	Floor													
311	6	Wall													
311	7	Floor													
311	7	Wall													

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
311	8	Floor				500										
311	8	Wall								920						
311	10	Floor														
311	10	Wall														
311	11	Floor														
311	11	Wall														
311	12	Floor														
311	12	Wall														
311	14	Floor														
311	14	Wall														
311	19	Floor														
311	19	Wall														
311	20	Floor				4500										
311	20	Wall	8750													
311	21	Floor					1000									
311	22	Floor				875										
311	23	Floor				1200										
311	24	Wall													1300	
311	25	Floor													690	
311	25	Wall								1075						
311	26	Floor													1500	
311	26	Wall											1500			
311	27	Floor				1440										
311	28	Floor				1900										
311	30	Floor													300	
311	31	Floor													1690	
311	31	Wall											1500			
311	32	Floor														
311	33	Floor														
311	34	Floor				625										
311	35	Floor						500								
311	37	Floor				3595										
311	37	Wall								2760						
311	38	Floor														
311	39	Floor														

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
311	8	Floor													
311	8	Wall													
311	10	Floor											2800		
311	10	Wall											3080		
311	11	Floor											3750		
311	11	Wall											6500		
311	12	Floor											11475		
311	12	Wall											2550		
311	14	Floor											1440		
311	14	Wall											2875		
311	19	Floor											2250		
311	19	Wall											4700		
311	20	Floor													
311	20	Wall													
311	21	Floor													
311	22	Floor													
311	23	Floor													
311	24	Wall													
311	25	Floor													
311	25	Wall													
311	26	Floor													
311	26	Wall													
311	27	Floor													
311	28	Floor													
311	30	Floor													
311	31	Floor													
311	31	Wall													
311	32	Floor											750		
311	33	Floor				500									
311	34	Floor													
311	35	Floor													
311	37	Floor													
311	37	Wall													
311	38	Floor	480												
311	39	Floor	1250												

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
311	100	Floor														
311	100	Wall													1820	
311	102	Floor														
311	102	Fume Hood														
311	104	Floor														
311	104	Wall													915	
311	105	Floor														
311	105	Wall													3125	
311	107	Floor														
311	109	Floor														
311	110	Floor														
311	112	Floor														
311	East Central	I-Beam														
311	Mezzanine	Floor														
311	West	I-Beam														
311	West Central	I-Beam														
312	1.2	Floor				180										
312	1.3	Floor				800										
312	1.3	Wall				960										
312	1.4	Wall				1200										
312	1.5	Floor						1540								
312	1.7	Floor				55										
312	3	Floor														
312	3.1	Floor														
312	3.2	Floor														
312	3.2	Wall														
312	101	Exhaust Vent														
312	101	Floor														
312	101	Fume Hood														
312	101.1	Floor				690										
312	102	Floor														
312	102	Wall														
312	103	Floor														

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
311	100	Floor	1050												
311	100	Wall													
311	102	Floor	360												
311	102	Fume Hood								1					
311	104	Floor	360												
311	104	Wall													
311	105	Floor	250												
311	105	Wall													
311	107	Floor	320												
311	109	Floor	300												
311	110	Floor	360												
311	112	Floor	360												
311	East Central	I-Beam									1				
311	Mezzanine	Floor											6070		
311	West	I-Beam									1				
311	West Central	I-Beam									1				
312	1.2	Floor													
312	1.3	Floor													
312	1.3	Wall													
312	1.4	Wall													
312	1.5	Floor													
312	1.7	Floor													
312	3	Floor											5985		
312	3.1	Floor											220		
312	3.2	Floor											550		
312	3.2	Wall											825		
312	101	Exhaust Vent													1
312	101	Floor											1		
312	101	Fume Hood													1
312	101.1	Floor													
312	102	Floor											1		
312	102	Wall											410		
312	103	Floor											1		

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
312	105	Floor														
312	110	Floor														
312	111	Exhaust Vent														
312	111	Floor														
312	111	Wall														
312	113	Floor														
312	114	Exhaust Vent														
312	114	Floor														
312	114	Floor Drain														
312	114	Wall														
312	115	Floor														
312	115	Floor Drain														
312	117	Exhaust Vent														
312	117	Floor														
312	117	Floor Drain														
312	117	Wall														
312	118	Exhaust Vent														
312	118	Floor														
312	120	Floor														
312	120	Fume Hood														
312	120	Wall														
312	121	Floor														
312	124	Floor														
312	125	Floor														
312	126	Floor														
312	126	Floor Drain														
312	135	Floor														
312	135	Wall														
312	137	Fume Hood														
312	141	Floor														
312	142	Floor														
312	143	Floor														
312	144	Floor														

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
312	105	Floor											270		
312	110	Floor											1		
312	111	Exhaust Vent													2
312	111	Floor											1		
312	111	Wall											630		
312	113	Floor											235		
312	114	Exhaust Vent													1
312	114	Floor											975		
312	114	Floor Drain													4
312	114	Wall											1540		
312	115	Floor											1		
312	115	Floor Drain													2
312	117	Exhaust Vent													2
312	117	Floor											1		
312	117	Floor Drain													2
312	117	Wall											1920		
312	118	Exhaust Vent													1
312	118	Floor											360		
312	120	Floor											180		
312	120	Fume Hood													1
312	120	Wall											360		
312	121	Floor											255		
312	124	Floor											100		
312	125	Floor											35		
312	126	Floor											280		
312	126	Floor Drain													2
312	135	Floor											2240		
312	135	Wall											11000		
312	137	Fume Hood													1
312	141	Floor	1080												
312	142	Floor	900												
312	143	Floor	130												
312	144	Floor	585												

See end of table for abbreviations

Table A-12
MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
312	145	Floor														
312	147	Floor														
312	199	Floor														
312	199	I-Beam														
312	199.1	Floor														
313	0.2	Floor						1155								
313	0.2	Wall				500										
313	0.3	Floor				4375										
313	0.3	Wall								3800						
313	0.4	Floor				80										
313	0.6	Floor						885								
313	0.6	Wall								1705						
313	0.7	Floor						990								
313	0.7	Wall				1750										
313	0.8	Floor						1155								
313	0.8	Wall													600	
313	0.9	Floor				115										
313	1.1	Floor				1125										
313	1.1	Wall		5625												
313	1.4	Floor							910							
313	1.5	Floor							4465							
313	1.5	I-Beam														
313	1.5	Wall		18750												
313	119	Floor														
313	125	Floor							690							
313	125	Fume Hood														
313	126	Floor														
313	129	Floor														
313	138	Floor				3160										
313	138	Wall		2880												
313	138.1	Floor														
313	152	Floor														
313	153	Floor														

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
312	145	Floor	120												
312	147	Floor	990												
312	199	Floor	360												
312	199	I-Beam										1			
312	199.1	Floor	460												
313	0.2	Floor													
313	0.2	Wall													
313	0.3	Floor													
313	0.3	Wall													
313	0.4	Floor													
313	0.6	Floor													
313	0.6	Wall													
313	0.7	Floor													
313	0.7	Wall													
313	0.8	Floor													
313	0.8	Wall													
313	0.9	Floor													
313	1.1	Floor													
313	1.1	Wall													
313	1.4	Floor													
313	1.5	Floor													
313	1.5	I-Beam									1				
313	1.5	Wall													
313	119	Floor	1610												
313	125	Floor													
313	125	Fume Hood								1					
313	126	Floor	670												
313	129	Floor	280												
313	138	Floor													
313	138	Wall													
313	138.1	Floor	65												
313	152	Floor	165												
313	153	Floor	1330												

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick		Concrete			Painted Concrete	Concrete Block		Painted Concrete Block	Dry Wall	Painted Dry Wall	Metal	
Contamination Type			M/B/P	M/B/P	PCB	M/B/P	PCB	Expl	M/B/P	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P	PCB
Building	Room	Surface														
313	193	Floor														
313	194	Floor														
313	194	Wall													1320	
313	195	Floor							270							
313	195	Fume Hood														
313	196	Floor				200										
313	222	Fume Hood														
313	227	Fume Hood														
313	227	Wall										2210				
313	258	Floor														
313	138A	Floor														
Total			24325	29365	1120	61380	22625	7725	6635	16510	2750	18970	11900	3720	13340	50

Commercial

Grand Total	298940
M/B/P	262920
PCB	28295
Expl	7725
Dry Wall	15620
Tile	74105
Dry Wall/Tile	89725

M/B/P - Metals/BNAs/Pesticides
Expl - Explosives
Shading represent areas where surfaces no longer exist

If an area had PCBs or explosives contamination, it was identified as 'PCB' or 'Expl' regardless of whether it had other types of chemicals

See end of table for abbreviations

Table A-12

MTL Indoor Areas (ft^2) Requiring Remedial Action for the Commercial Scenario - Room-by-Room Breakdown (continued)

Surface Type			Tile		Wood		Exhaust Vent	Floor Drain		Fume Hood	I-Beam		Areas Decontaminated for Radiological Contamination		
Contamination Type			M/B/P	PCB	M/B/P	PCB	M/B/P	M/B/P	PCB	M/B/P	M/B/P	PCB	area (M/B/P)	area (PCB)	items (M/B/P)
Building	Room	Surface													
313	193	Floor	345												
313	194	Floor	570												
313	194	Wall													
313	195	Floor													
313	195	Fume Hood								1					
313	196	Floor													
313	222	Fume Hood								1					
313	227	Fume Hood								1					
313	227	Wall													
313	258	Floor	1080												
313	138A	Floor	65												
Total			72855	1250	3920	500	3	5	2	20	4	5	84910 & 14 areas	1 area	24

Commercial

Grand Total	298940
M/B/P	262920
PCB	28295
Expl	7725
Dry Wall	15620
Tile	74105
Dry Wall/Tile	89725

Outlined totals above do not represent areas they represent the number of items

M/B/P - Metals/BNAs/Pesticides
Expl - Explosives
Shading represent areas where surfaces no longer exist

See end of table for abbreviations

Table A-13

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Room-by-Room Breakdown

Surface Type			Brick	Painted Brick	Concrete			Concrete Block		Painted Concrete Block	Dry Wall	Metal	Tile
Contamination Type			M/B/P	M/B/P	M/B/P	Expl	PCB	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P
Building	Room	Surface											
36	102	Wall						2700					
36	Auditorium	Floor					3600						
36	Library	Wall								2100			
37	107	Wall	150										
37	113	Wall	150										
37	115	Wall	150										
37	116	Wall	250										
37	113A	Wall	200										
37	Garage	Floor			1550								
37	P/E Storage	Wall	1400										
39	113	Floor			440								
39	141	Floor											495
39	141	Wall									550		
39	144	Wall								300			
39	145	Fume Hood											
39	146	Floor											80
39	146	Wall								350			
39	159	Wall								400			
39	247	Wall											
39	328	Floor											400
39	329	Floor											400
39	331	Fume Hood											
39	332	Floor											660
39	332	Fume Hood											
39	403	Wall								1000			
39	413	Floor											450
39	448	Floor											150
39	453	Floor											100
39	506	Floor											100
39	513	Floor											
39	529	Exhaust Vent											
39	529	Fume Hood											

Note: The total residential scenario area requiring remediation is the sum of the areas in Tables A-12 and A-13
See end of table for abbreviations

Table A-13

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Room-by-Room Breakdown (continued)

Surface Type			Exhaust Vent	Floor Drain	Fume Hood	I-Beam	Areas Decontaminated for Radiological Contamination	
Contamination Type			M/B/P	M/B/P	M/B/P	M/B/P	area (M/B/P)	items (M/B/P)
Building	Room	Surface						
36	102	Wall						
36	Auditorium	Floor						
36	Library	Wall						
37	107	Wall						
37	113	Wall						
37	115	Wall						
37	116	Wall						
37	113A	Wall						
37	Garage	Floor						
37	P/E Storage	Wall						
39	113	Floor						
39	141	Floor						
39	141	Wall						
39	144	Wall						
39	145	Fume Hood						2
39	146	Floor						
39	146	Wall						
39	159	Wall						
39	247	Wall					600	
39	328	Floor						
39	329	Floor						
39	331	Fume Hood			2			
39	332	Floor						
39	332	Fume Hood			1			
39	403	Wall						
39	413	Floor						
39	448	Floor						
39	453	Floor						
39	506	Floor						
39	513	Floor					180	
39	529	Exhaust Vent	1					
39	529	Fume Hood			1			

Note: The total residential scenario area requiring remediation is the sum of the areas in Tables A-12 and A-13
See end of table for abbreviations

Table A-13

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick	Concrete			Concrete Block		Painted Concrete Block	Dry Wall	Metal	Tile
Contamination Type			M/B/P	M/B/P	M/B/P	Expl	PCB	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P
Building	Room	Surface											
39	531	Floor											600
39	531	Wall									1270		
39	534	Fume Hood											
39	107A	Wall								500			
39	236A	Floor											160
39	243A	Wall						720					
39	301B	Fume Hood											
39	403A	Wall									250		
39	D	Wall						500					
60	105.3	Floor Drain											
97	144	Fume Hood											
97	145	Floor											1000
97	146	Fume Hood											
97	Attic	Exhaust Vent											
97	Machine Shop	Wall						490					
243	4	Wall						1000					
244	Bunker - left	Floor				1500							
292	106	Wall							900				
292	125	Floor Drain											
292	125	Wall						1000					
292	205	Wall						800					
292	235	Fume Hood											
292	245	Fume Hood											
292	250	Wall						450					
311	24	Floor										625	
311	34	Wall										1000	
311	102	Wall										600	
311	107	Fume Hood											
311	East	I-Beam											
312	1.4	Floor				510							
312	115	Wall											
312	121	Wall											

Note: The total residential scenario area requiring remediation is the sum of the areas in Tables A-12 and A-13
See end of table for abbreviations

Table A-13

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Room-by-Room Breakdown (continued)

Surface Type			Exhaust Vent	Floor Drain	Fume Hood	I-Beam	Areas Decontaminated for Radiological Contamination	
Contamination Type			M/B/P	M/B/P	M/B/P	M/B/P	area (M/B/P)	items (M/B/P)
Building	Room	Surface						
39	531	Floor						
39	531	Wall						
39	534	Fume Hood			2			
39	107A	Wall						
39	236A	Floor						
39	243A	Wall						
39	301B	Fume Hood			1			
39	403A	Wall						
39	D	Wall						
60	105.3	Floor Drain		1				
97	144	Fume Hood			1			
97	145	Floor						
97	146	Fume Hood			2			
97	Attic	Exhaust Vent	1					
97	Machine Shop	Wall						
243	4	Wall						
244	Bunker - left	Floor						
292	106	Wall						
292	125	Floor Drain		1				
292	125	Wall						
292	205	Wall						
292	235	Fume Hood			2			
292	245	Fume Hood			1			
292	250	Wall						
311	24	Floor						
311	34	Wall						
311	102	Wall						
311	107	Fume Hood			1			
311	East	I-Beam				1		
312	1.4	Floor						
312	115	Wall					1140	
312	121	Wall					745	

Note: The total residential scenario area requiring remediation is the sum of the areas in Tables A-12 and A-13
See end of table for abbreviations

Table A-13

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Room-by-Room Breakdown (continued)

Surface Type			Brick	Painted Brick	Concrete			Concrete Block		Painted Concrete Block	Dry Wall	Metal	Tile
Contamination Type			M/B/P	M/B/P	M/B/P	Expl	PCB	M/B/P	PCB	M/B/P	M/B/P	M/B/P	M/B/P
Building	Room	Surface											
312	137	Floor											
312	137	Wall											
312	142	Wall									1100		
312	199.1	Fume Hood											
313	0.5	Wall			1050								
313	1.2	Wall		500									
313	1.3	Floor			400								
313	1.3	Fume Hood											
313	126	Fume Hood											
313	126	Wall								800			
313	196	Wall	500										
313	250	Wall								480			
313	253	Wall						1200					
Residential Total			2800	500	3440	2010	3600	8860	900	5930	3170	2225	4595
Scenario 3 Total			2800	500	3000	1500	0	1200	0	1280	0	0	0

	Residential	Scenario 3
Grand Total	336970	309220
M/B/P	288465	271700
PCB	34875	28295
Expl	13630	9225
Dry Wall	18790	15620
Tile	78700	74105
Dry Wall/Tile	97490	89725

M/B/P - Metals/BNAs/Pesticides
Expl - Explosives

Areas with different decontamination methods in the residential scenario

Building	Room	Surface	Material	Commercial Decontamination Method	Residential Decontamination Method	AREA
36	0.2	Wall	Brick	Metals	PCB	2080
311	West	I-Beam		Metals	Explosives	1
311	West Central	I-Beam		Metals	Explosives	1
312	1.3	Floor	Concrete	Metals	Explosives	800
312	1.7	Floor	Concrete	Metals	Explosives	55
312	101.1	Floor	Concrete	Metals	Explosives	690
313	0.7	Wall	Concrete	Metals	Explosives	1750
313	0.8	Wall	Painted Metal	Metals	Explosives	600

If an area had PCBs or explosives contamination, it was identified as 'PCB' or 'Expl' regardless of whether it had other types of chemicals

Note: The total residential scenario area requiring remediation is the sum of the areas in Tables A-12 and A-13
See end of table for abbreviations

Table A-13

Additional MTL Indoor Areas (ft^2) Requiring Remedial Action for the Residential Scenario - Room-by-Room Breakdown (continued)

Surface Type			Exhaust Vent	Floor Drain	Fume Hood	I-Beam	Areas Decontaminated for Radiological Contamination	
Contamination Type			M/B/P	M/B/P	M/B/P	M/B/P	area (M/B/P)	items (M/B/P)
Building	Room	Surface						
312	137	Floor					450	
312	137	Wall					720	
312	142	Wall						
312	199.1	Fume Hood			1			
313	0.5	Wall						
313	1.2	Wall						
313	1.3	Floor						
313	1.3	Fume Hood			1			
313	126	Fume Hood			1			
313	126	Wall						
313	196	Wall						
313	250	Wall						
313	253	Wall						
Residential Total			2	2	17	1	3835	2
Scenario 3 Total			0	0	2	0	0	0

	Residential	Scenario 3
Grand Total	336970	309220
M/B/P	288465	271700
PCB	34875	28295
Expl	13630	9225
Dry Wall	18790	15620
Tile	78700	74105
Dry Wall/Tile	97490	89725

Outlined totals above do not represent areas they represent the number of items

M/B/P - Metals/BNAs/Pesticides
Expl - Explosives

Note: The total residential scenario area requiring remediation is the sum of the areas in Tables A-12 and A-13
See end of table for abbreviations

Table A-14
Levels of Significant Risk Example Calculation

Compound : DDT	Minimum Concentration	Comments
Residential		
Reuse scenario	0.27	The minimum clean-up limit from Table A-3
Renovation worker scenario	51	The minimum clean-up limit from Table A-4
Calculated Level of No Significant Risk	0.27	The minimum clean-up limit from Table A-3 and A-4
Maximum detection in background	0.1	The maximum detection from Table A-6
Comparison Level of No Significant Risk	0.27	The maximum of : 1) Calculated Level of No Significant Risk 2) Maximum detection in background
Commercial		
Reuse scenario	3.8	The minimum clean-up limit from Table A-1
Renovation worker scenario	42	The minimum clean-up limit from Table A-2
Calculated Level of No Significant Risk	3.8	The minimum clean-up limit from Table A-1 and A-2
Maximum detection in background	0.01	The maximum detection from Table A-5
Comparison Level of No Significant Risk	3.8	The maximum of : 1) Calculated Level of No Significant Risk 2) Maximum detection in background

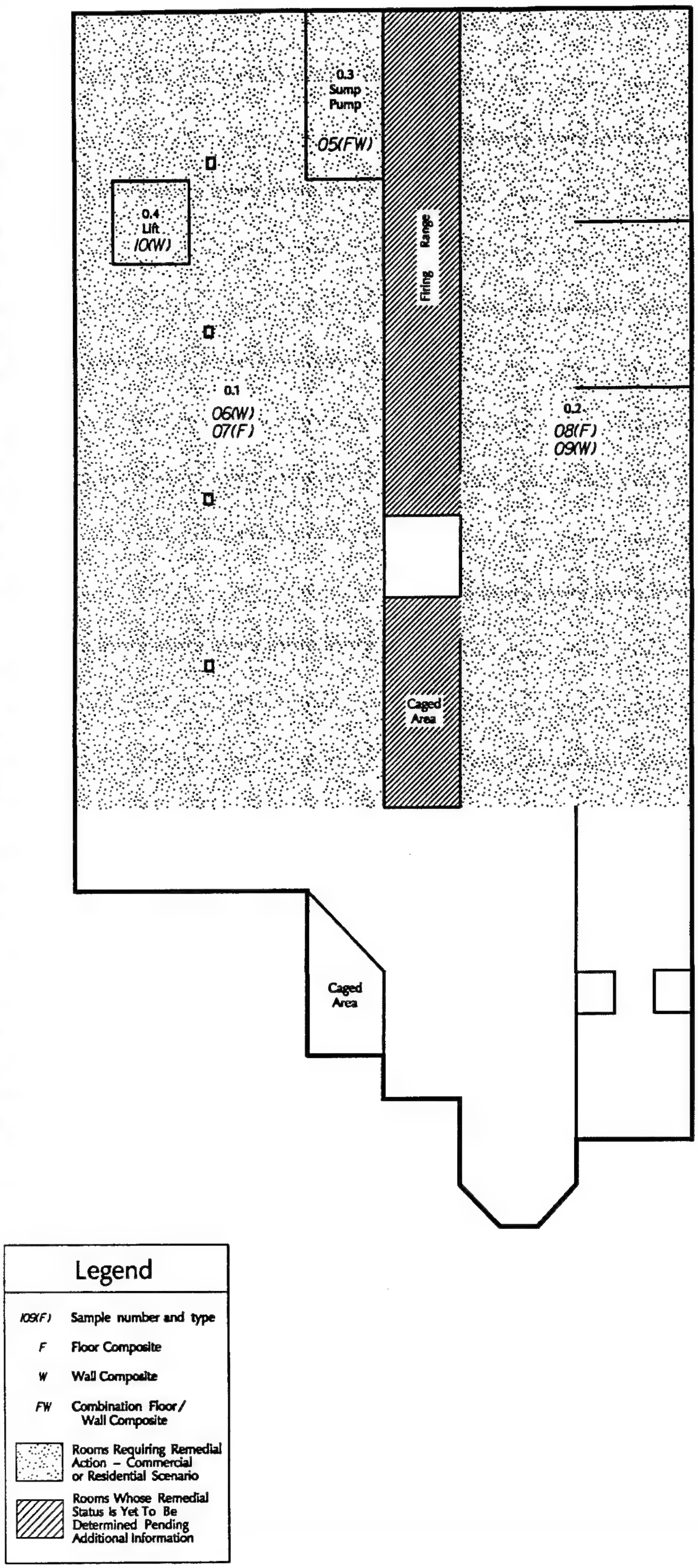
Table A-15
Location of On-Site Residential and Off-Site Commercial Background Wipe Samples

Sample	Location	Total Area of sample (cm^2)
On-Site Residential Samples		
Building 111 (Commanders Office)		
111WP01	Shelf in Kitchen	200
111WP02	Wall - 2nd floor bath	300
111WP03	Floor - 3rd floor attic	200
111WP04	Wall - basement	300
111WP05	Floor - basement	200
Building 117 (On-Site Apartment)		
117WP01	Wall - basement	400
117WP02	Floor - basement	200
Building 118 (On-Site Apartment)		
118WP01	Floor - 1st floor hall	100
118WP02	Floor - 1st floor kitchen	100
118WP03	Wall - basement	400
118WP04	Floor - basement	200
Off-Site Commercial Samples		
Firehouse (Main Bay)		
BKWP01	Wall	100
BKWP02	Floor	100
Lumber Yard (Small Storage Bay)		
BKWP03	Wall	100
BKWP04	Floor	100
Hellenic Center (Basement)		
BKWP05	Floor	100
BKWP06	Wall	100
Cuniff Elementary School (Basement)		
BKWP07	Wall	100
BKWP08	Floor	100

APPENDIX B

BUILDING FLOOR PLANS SHOWING AREAS OF CONTAMINATION

THE SHADED AREAS ON THE FOLLOWING FLOORPLANS
INCLUDE AREAS THAT WERE REMEDIATED
DURING THE RADIOLOGICAL DECOMMISSIONING



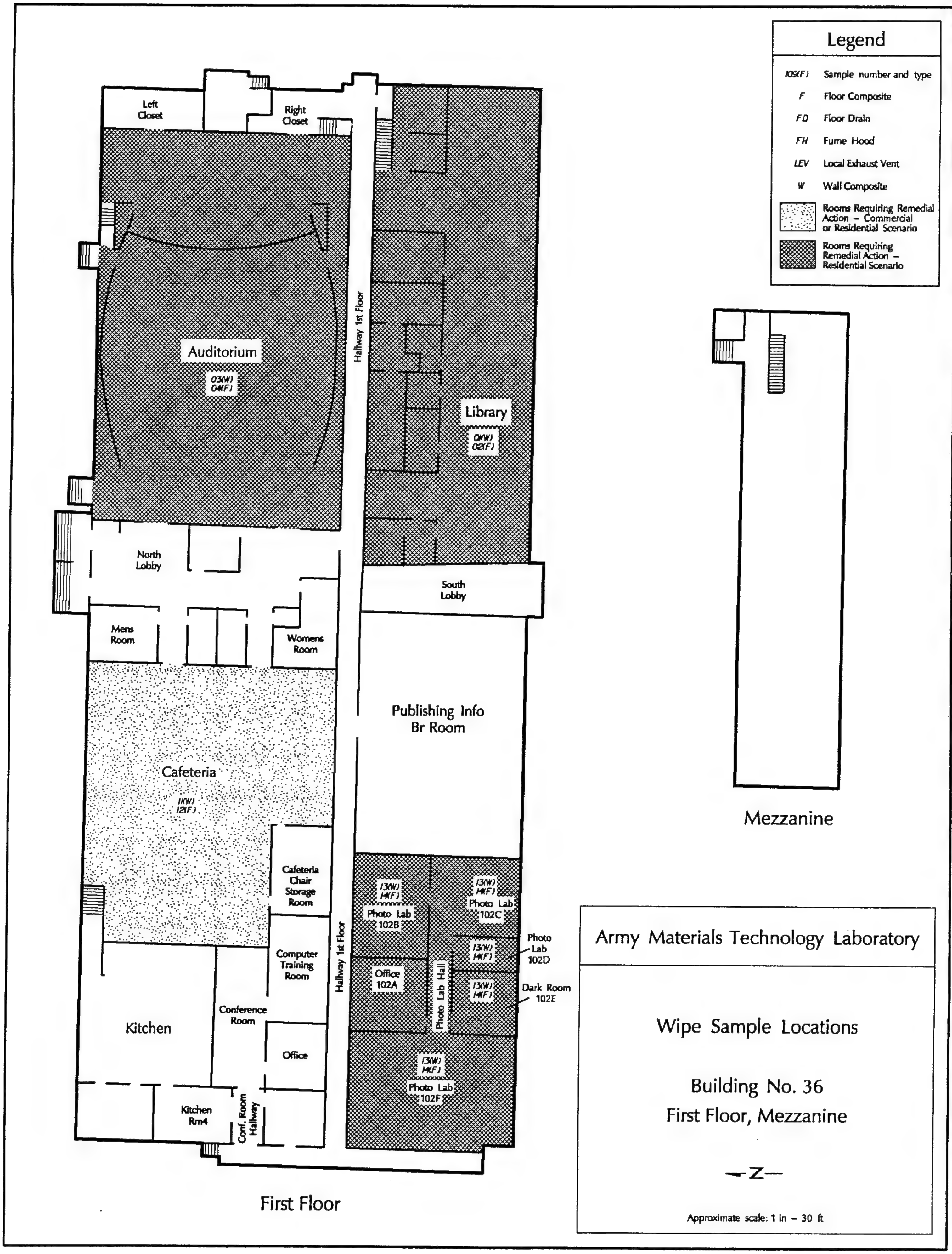
Army Materials Technology Laboratory

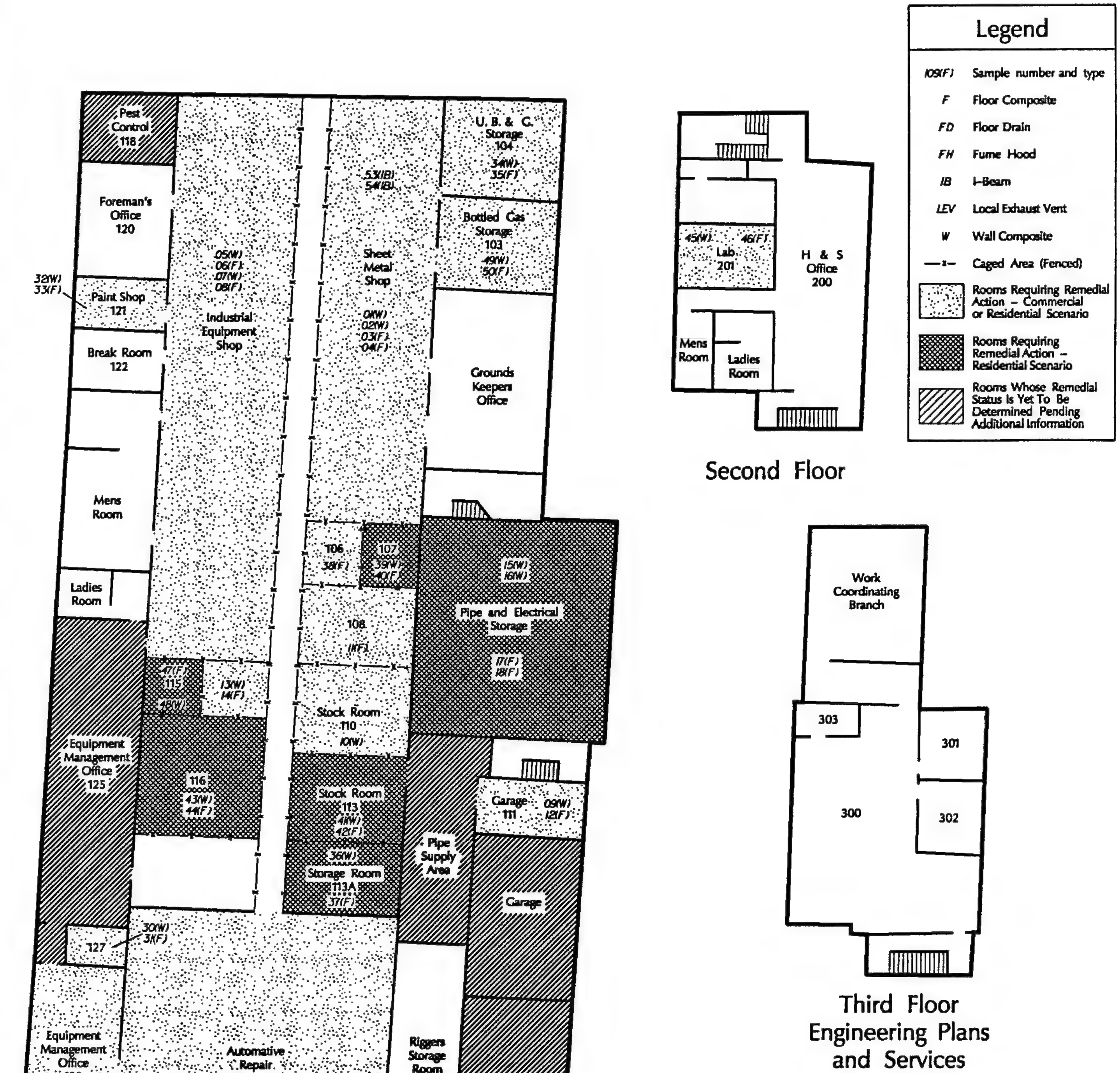
Wipe Sample Locations

Building No. 36
Basement

—Z—

Approximate scale: unknown


Legend
109(F) Sample number and type
F Floor Composite
FD Floor Drain
FH Fume Hood
LEV Local Exhaust Vent
W Wall Composite
Rooms Requiring Remedial Action – Commercial or Residential Scenario
Rooms Requiring Remedial Action – Residential Scenario
Left Closet
Right Closet
Auditorium
03(W) 04(F)
Hallway 1st Floor
Library
01(W) 02(F)
North Lobby
South Lobby
Mens Room
Womens Room
Publishing Info Br Room
Cafeteria
11(W) 12(F)
Cafeteria Chair Storage Room
Computer Training Room
Hallway 1st Floor
13(W) 14(F)
Photo Lab 102B
13(W) 14(F)
Photo Lab 102C
13(W) 14(F)
Photo Lab 102D
13(W) 14(F)
Dark Room 102E
Office 102A
Photo Lab Hall
13(W) 14(F)
Photo Lab 102F
Kitchen
Conference Room
Office
Kitchen Rm4
Conf. Room Hallway
First Floor
Mezzanine
Army Materials Technology Laboratory
Wipe Sample Locations
Building No. 36
First Floor, Mezzanine
Z
Approximate scale: 1 in – 30 ft



Army Materials Technology Laboratory

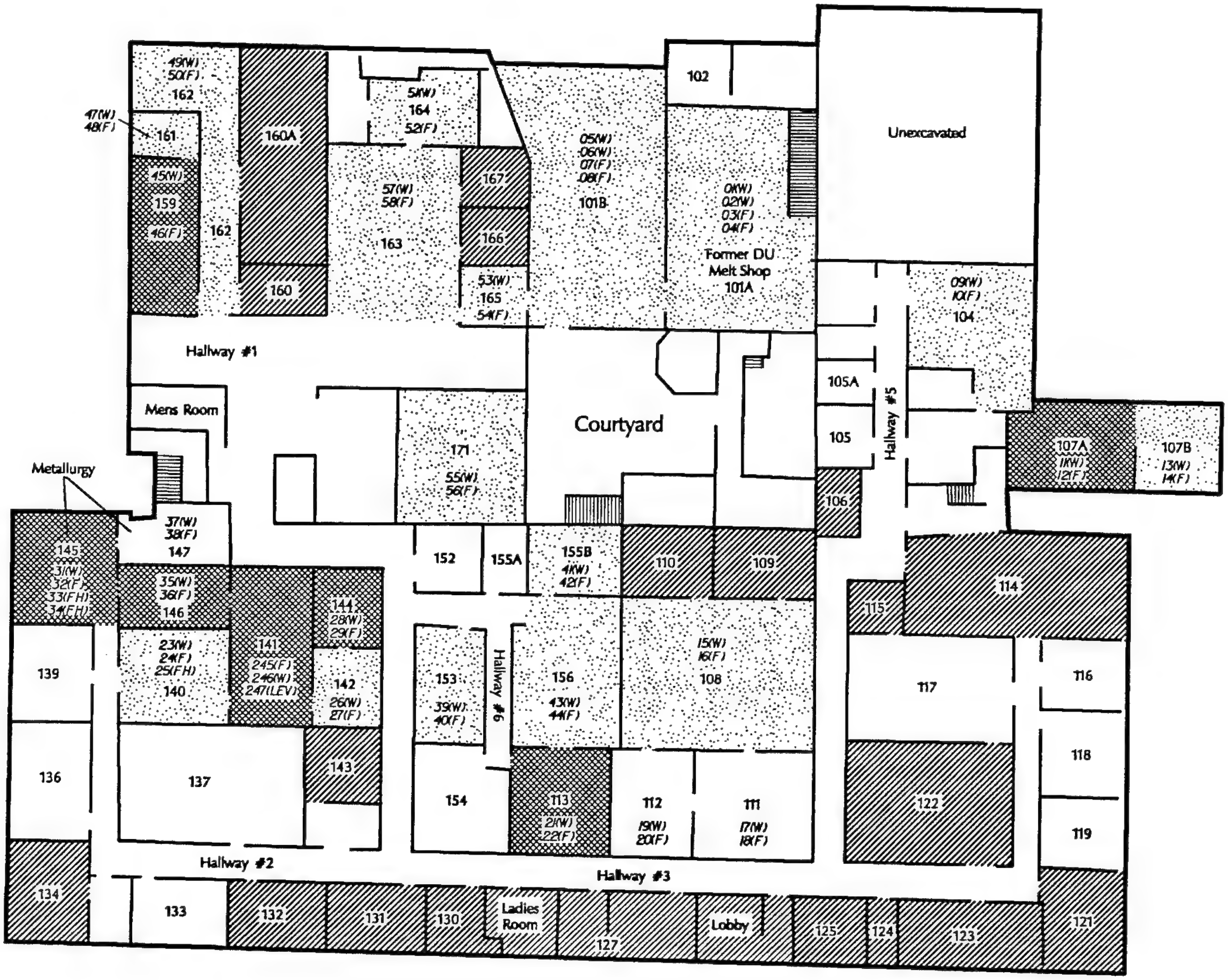
Wipe Sample Locations

Building No. 37

First Floor

—Z—

Approximate scale: 1 in – 35 ft



Rooms Sampled

101A	Test Furnace (former DU Melting)
101B	Former Oil Storage (now Corrosives Storage)
104	Laboratory
107A	Metals Lab
107B	Laboratory
108	Equipment Calibration
111	Testing Lab
112	Calibration Lab
113	Dark Room
140	Laboratory
141	Photography /Laboratory
142	Dark Room
144	Dark Room
145	Laboratory
146	Metallography
147	Laboratory
153	Electron Microscopy Lab
155B	Sample Prep. Lab
156	Electron Microscopy Lab
159	Former Laboratory
161	Sample Prep /Metals Lab
162	Sample Prep /Metals Lab
163	Custodial/Drum Storage
164	Laboratory
165	Drum Storage

Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
FH	Fume Hood
LEV	Local Exhaust Vent
W	Wall Composite
	Rooms Requiring Remedial Action – Commercial or Residential Scenario
	Rooms Requiring Remedial Action – Residential Scenario
	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

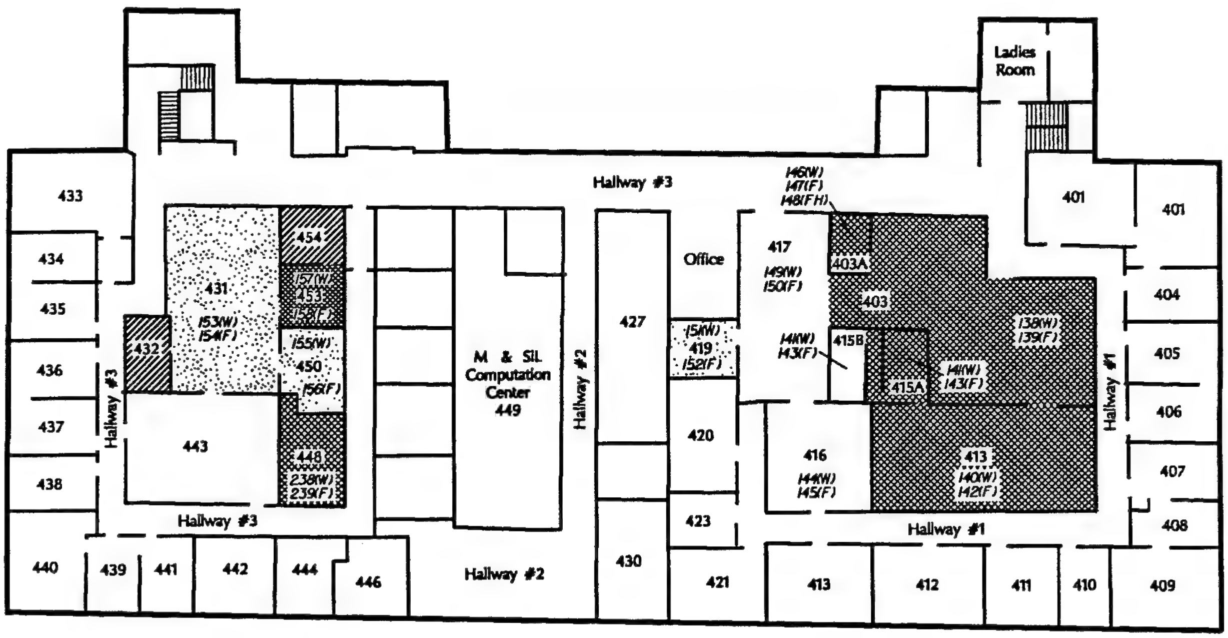
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 39
First Floor

N

Approximate scale: 1 in – 25 ft



Rooms Sampled

403	Strength of Materials Lab
403A	Laboratory
413	Helium Neon Laser Lab
413A	Dark Room
413B	Dark Room
416	Laser Lab
417	Laboratory
419	Laboratory
431	Storage
448	Laboratory
450	Metals Lab
453	Laboratory

Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
FH	Fume Hood
LEV	Local Exhaust Vent
W	Wall Composite
	Rooms Requiring Remedial Action – Commercial or Residential Scenario
	Rooms Requiring Remedial Action – Residential Scenario
	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

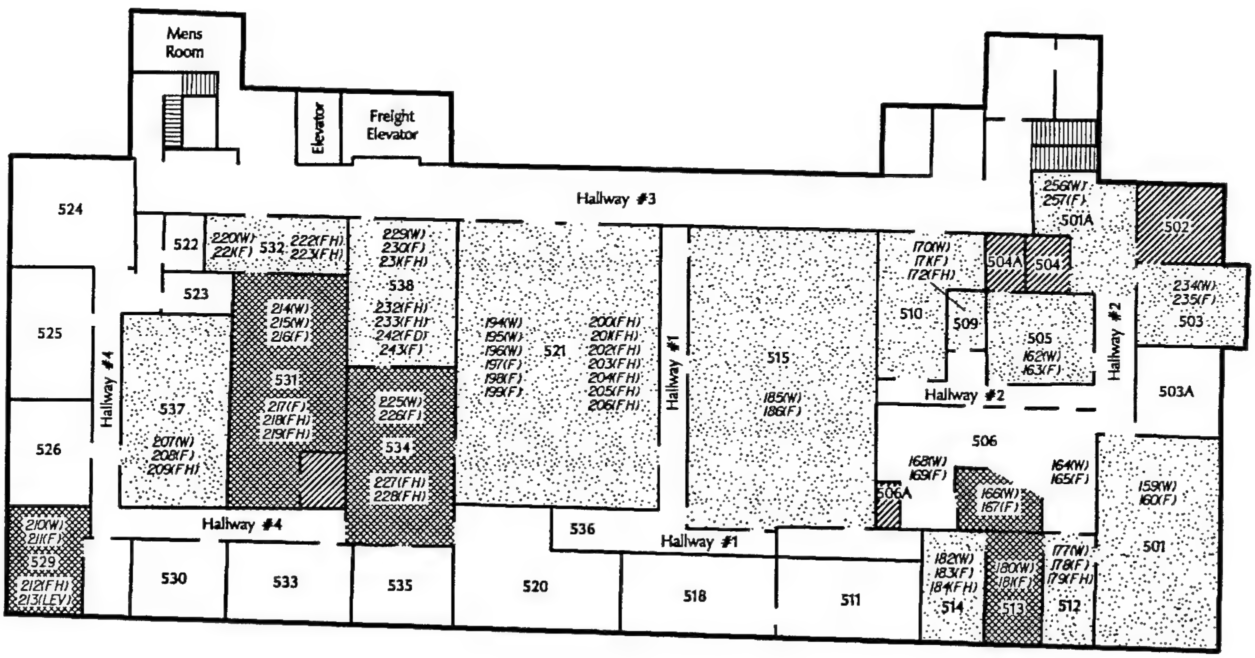
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 39
Fourth Floor

N

Approximate scale: 1 in – 30 ft



Rooms Sampled

501	Storage
501A	Laboratory
503	Possible Past Lab
505	Laboratory
506	Laboratory
509	Laboratory
512	Laboratory
513	Laboratory
514	Laboratory
515	Laboratory
521	Laboratory
527	Laboratory
529	Laboratory
531	Corrosives Lab
532	Laboratory
534	Laboratory
538	Electroplating Lab

Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
FH	Fume Hood
LEV	Local Exhaust Vent
W	Wall Composite
(light stipple)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(dark crosshatch)	Rooms Requiring Remedial Action – Residential Scenario
(diagonal hatch)	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

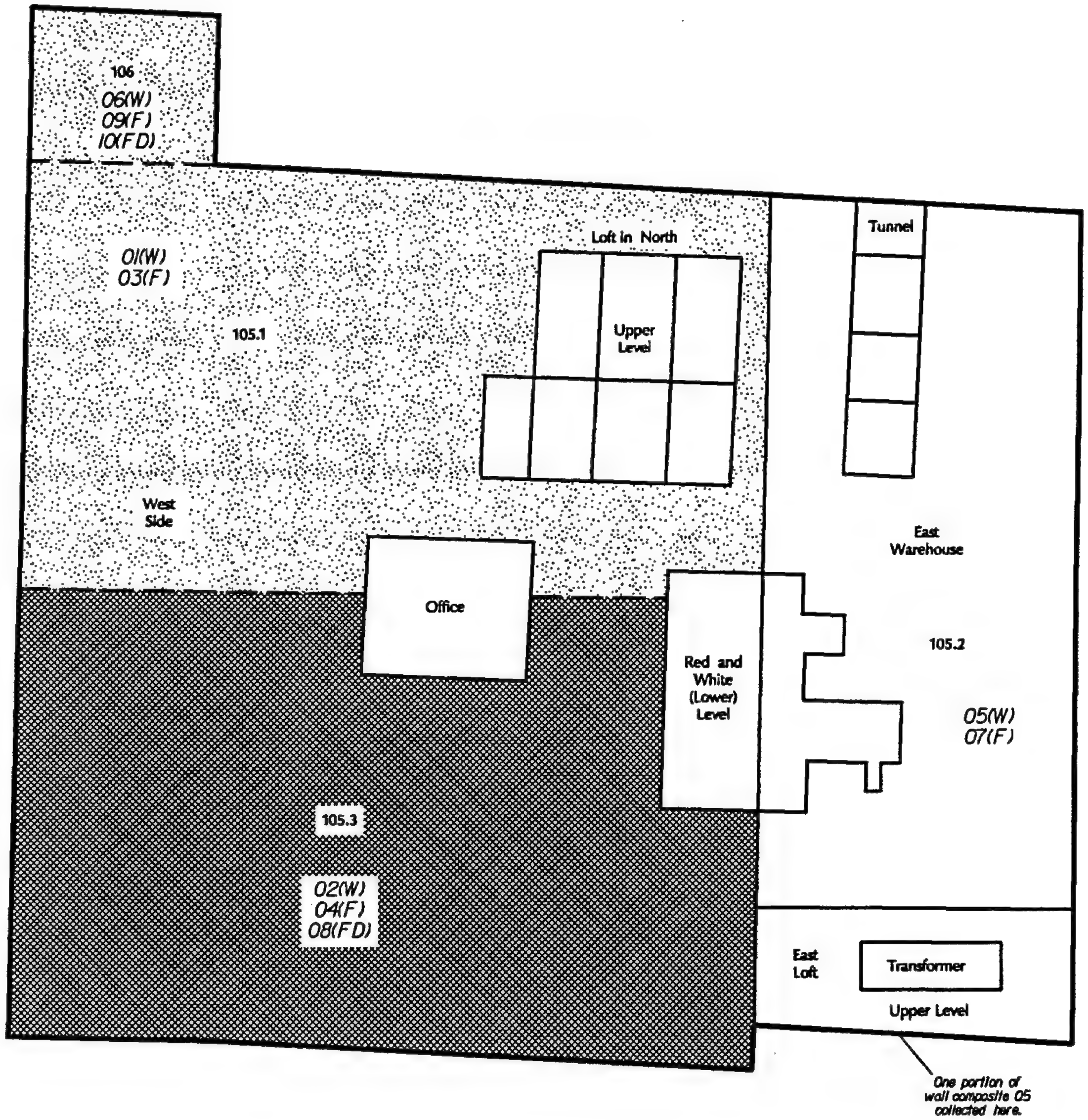
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 39
Fifth Floor

N

Approximate scale: 1 in – 30 ft



Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 60
First Floor

N

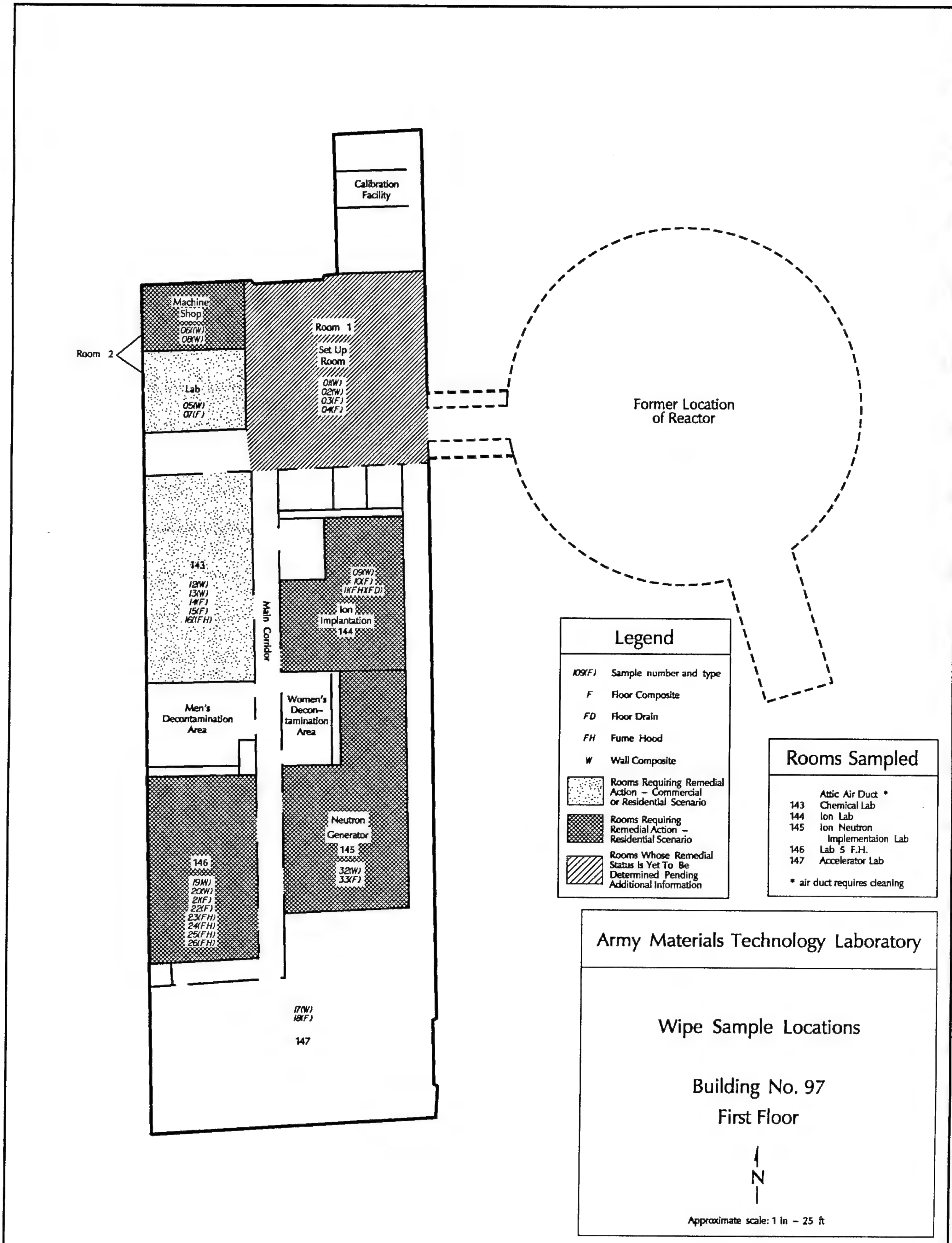
Approximate scale: 1 in – 20 ft

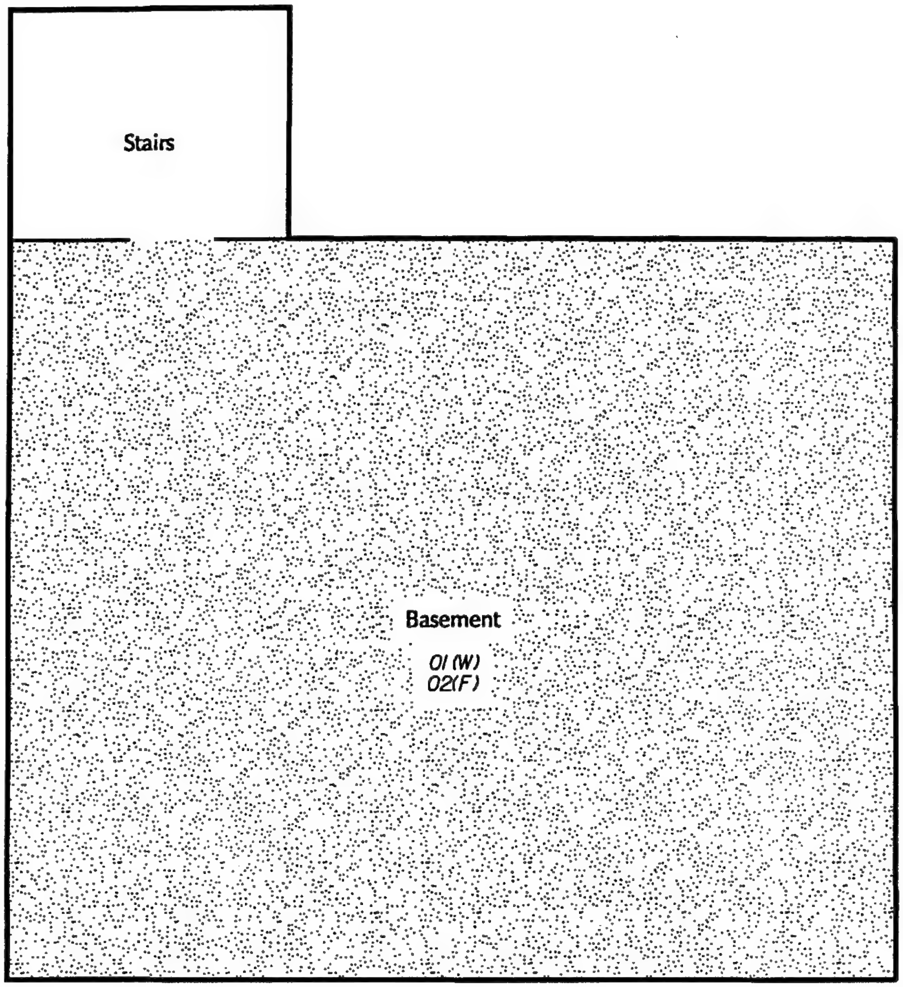
Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
W	Wall Composite
	Rooms Requiring Remedial Action – Commercial or Residential Scenario
	Rooms Requiring Remedial Action – Residential Scenario

Rooms Sampled

105.1	Boiler Room
105.2	Warehouse
105.3	Boiler Room
106	Storage


Calibration Facility
Machine Shop
06(W)
08(W)
Room 2
Lab
05(W)
07(F)
Room 1
Set Up Room
01(W)
02(W)
03(F)
04(F)
Former Location of Reactor
143
12(W)
13(W)
14(F)
15(F)
16(FH)
Main Corridor
09(W)
10(F)
11(FH)(FD)
Ion Implantation
144
Men's Decontamination Area
Women's Decon-tamination Area
Neutron Generator
145
32(W)
33(F)
146
19(W)
20(W)
21(F)
22(F)
23(FH)
24(FH)
25(FH)
26(FH)
17(W)
18(F)
147
Legend
109(F) Sample number and type
F Floor Composite
FD Floor Drain
FH Fume Hood
W Wall Composite
Rooms Requiring Remedial Action – Commercial or Residential Scenario
Rooms Requiring Remedial Action – Residential Scenario
Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information
Rooms Sampled
Attic Air Duct *
143 Chemical Lab
144 Ion Lab
145 Ion Neutron Implementaion Lab
146 Lab 5 F.H.
147 Accelerator Lab
* air duct requires cleaning
Army Materials Technology Laboratory
Wipe Sample Locations
Building No. 97
First Floor
N
Approximate scale: 1 in – 25 ft



Army Materials Technology Laboratory

Wipe Sample Locations

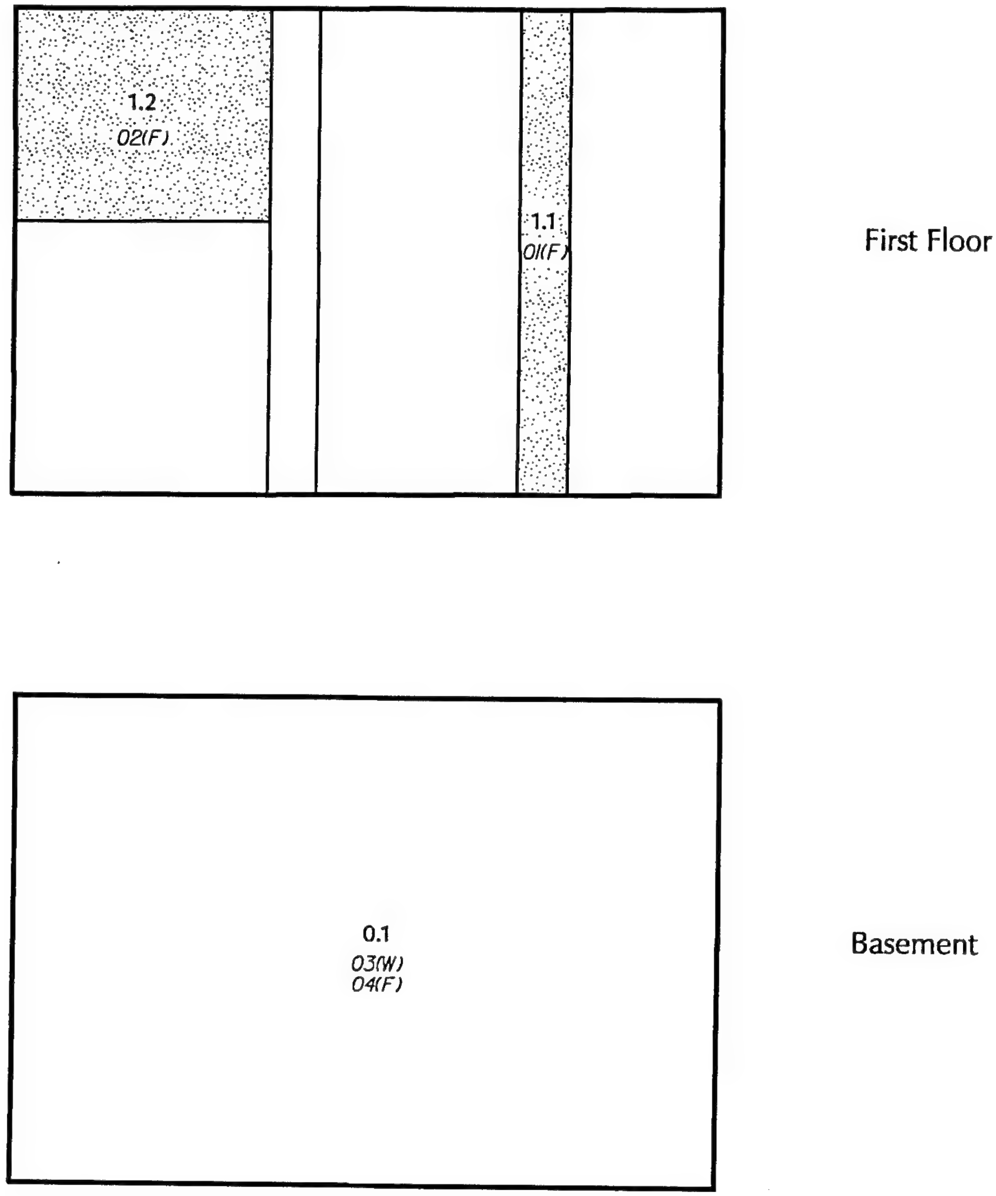
Building No. 117
Basement

N

Approximate scale: 1 in – 5 ft

Legend

109(F)	Sample number and type
F	Floor Composite
W	Wall Composite
	Rooms Requiring Remedial Action – Commercial or Residential Scenario



Army Materials Technology Laboratory

Wipe Sample Locations

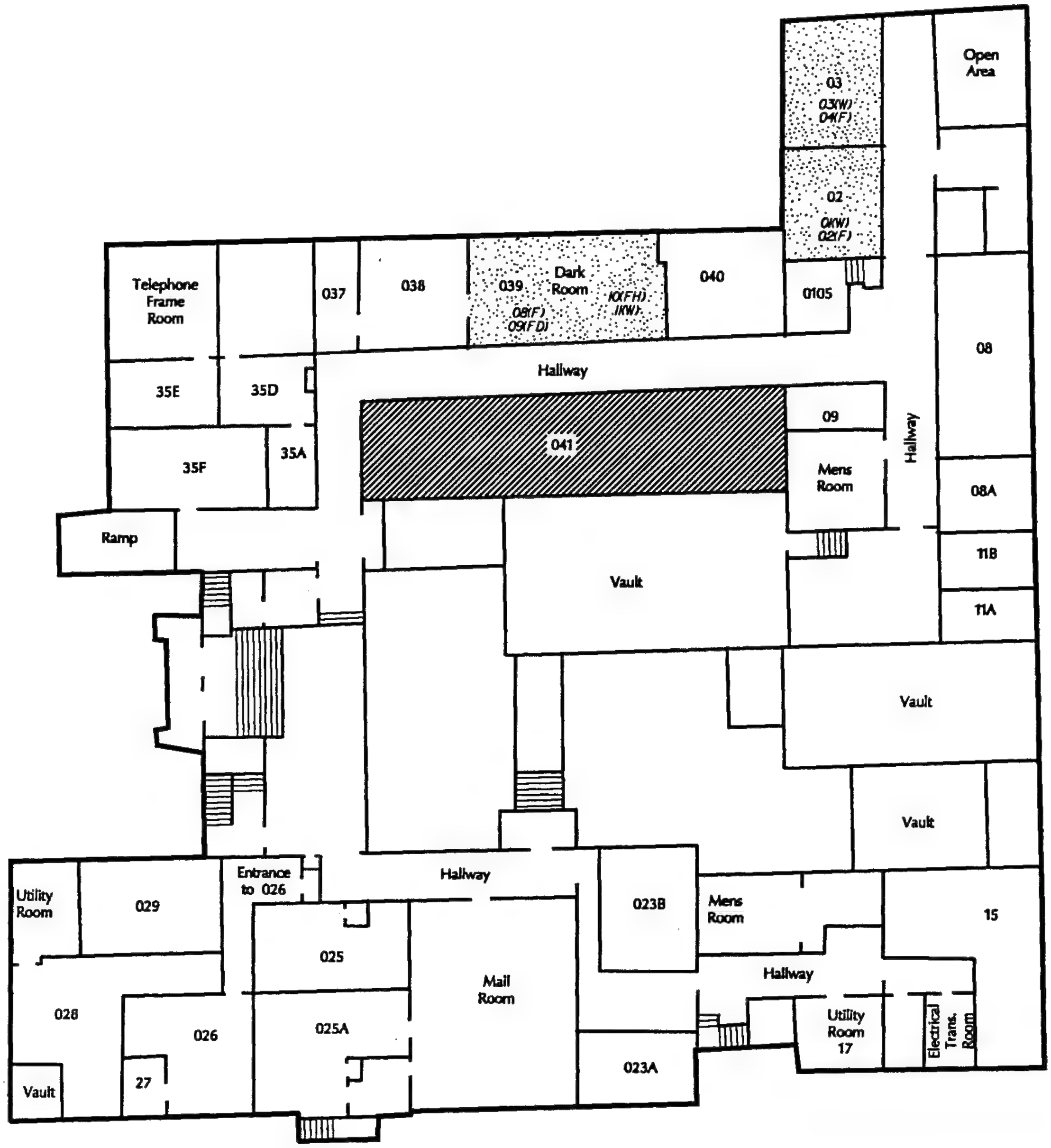
Building No. 118
First Floor, Basement

N

Approximate scale: unknown

Legend

109(F)	Sample number and type
F	Floor Composite
W	Wall Composite
(stippled)	Rooms Requiring Remedial Action – Commercial or Residential Scenario



Rooms Sampled

039	Dark Room
02	Janitors Room
03	

Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
FH	Fume Hood
W	Wall Composite
(dotted pattern)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(hatched pattern)	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

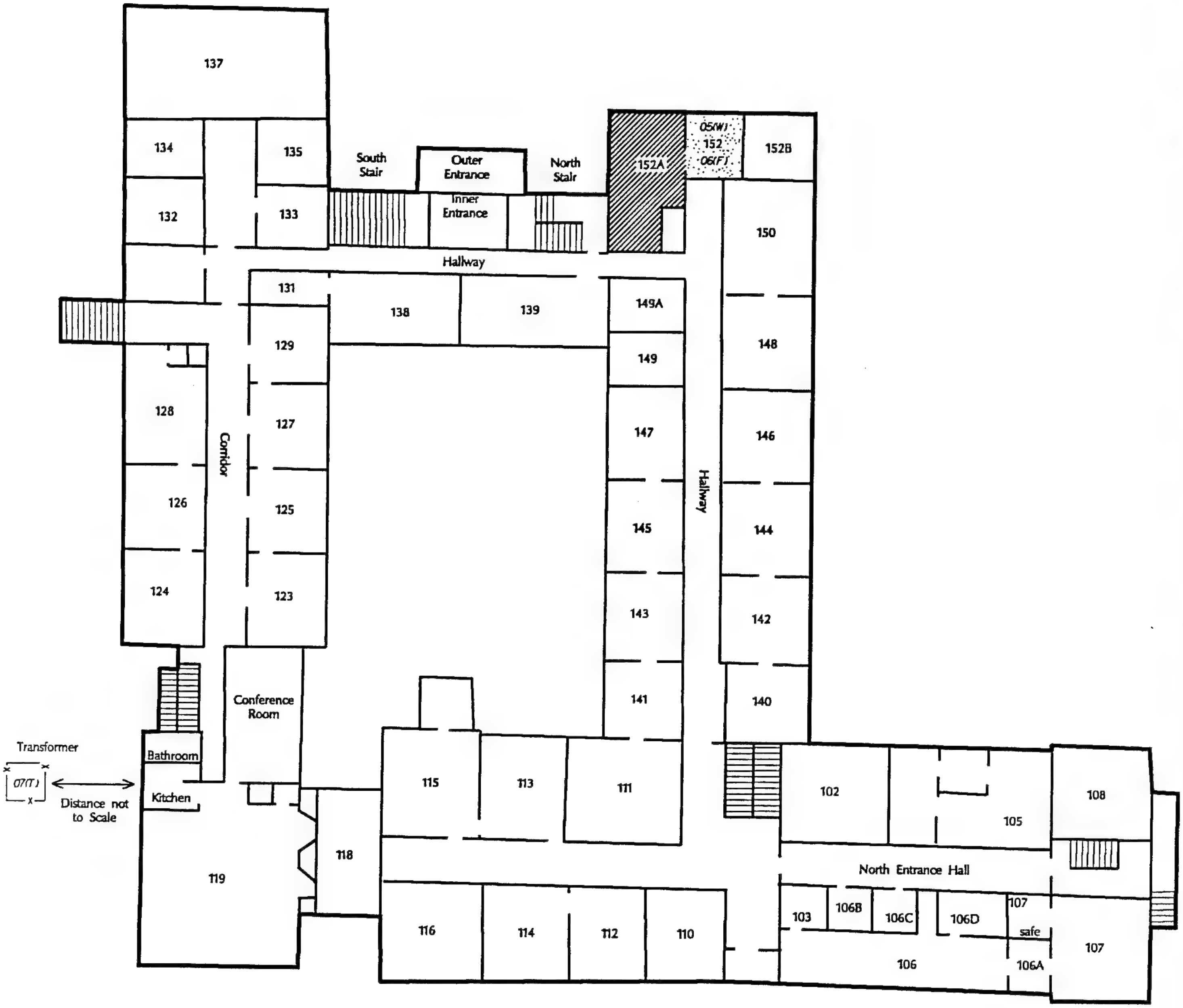
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 131
Basement

N

Approximate scale: 1 in – 30 ft



Legend

105(F)	Sample number and type
F	Floor Composite
W	Wall Composite
T	Transformer Composite
(dotted)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(hatched)	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

Rooms Sampled

152

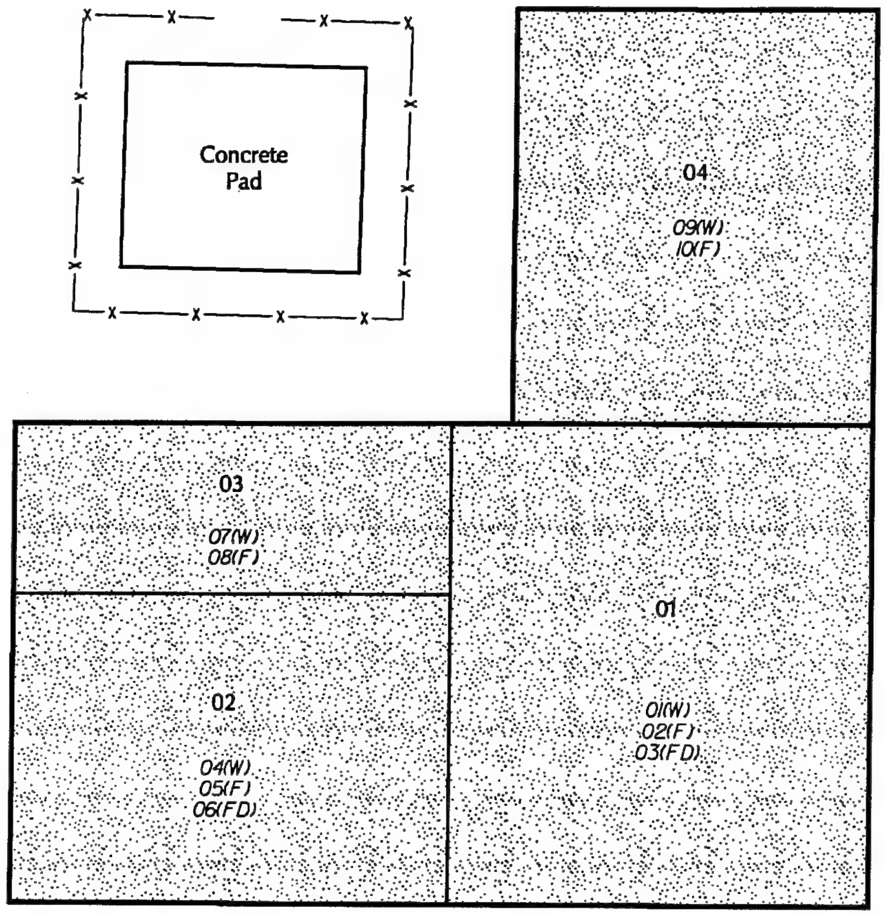
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 131
First Floor

—Z→

Approximate scale: 1 in – 30 ft



Rooms Sampled

01	Solvents Storage
02	Solvents Storage
03	Acids Storage
04	Tin Shed

Legend

K09(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
W	Wall Composite
(stippled)	Rooms Requiring Remedial Action – Commercial or Residential Scenario

Army Materials Technology Laboratory

Wipe Sample Locations

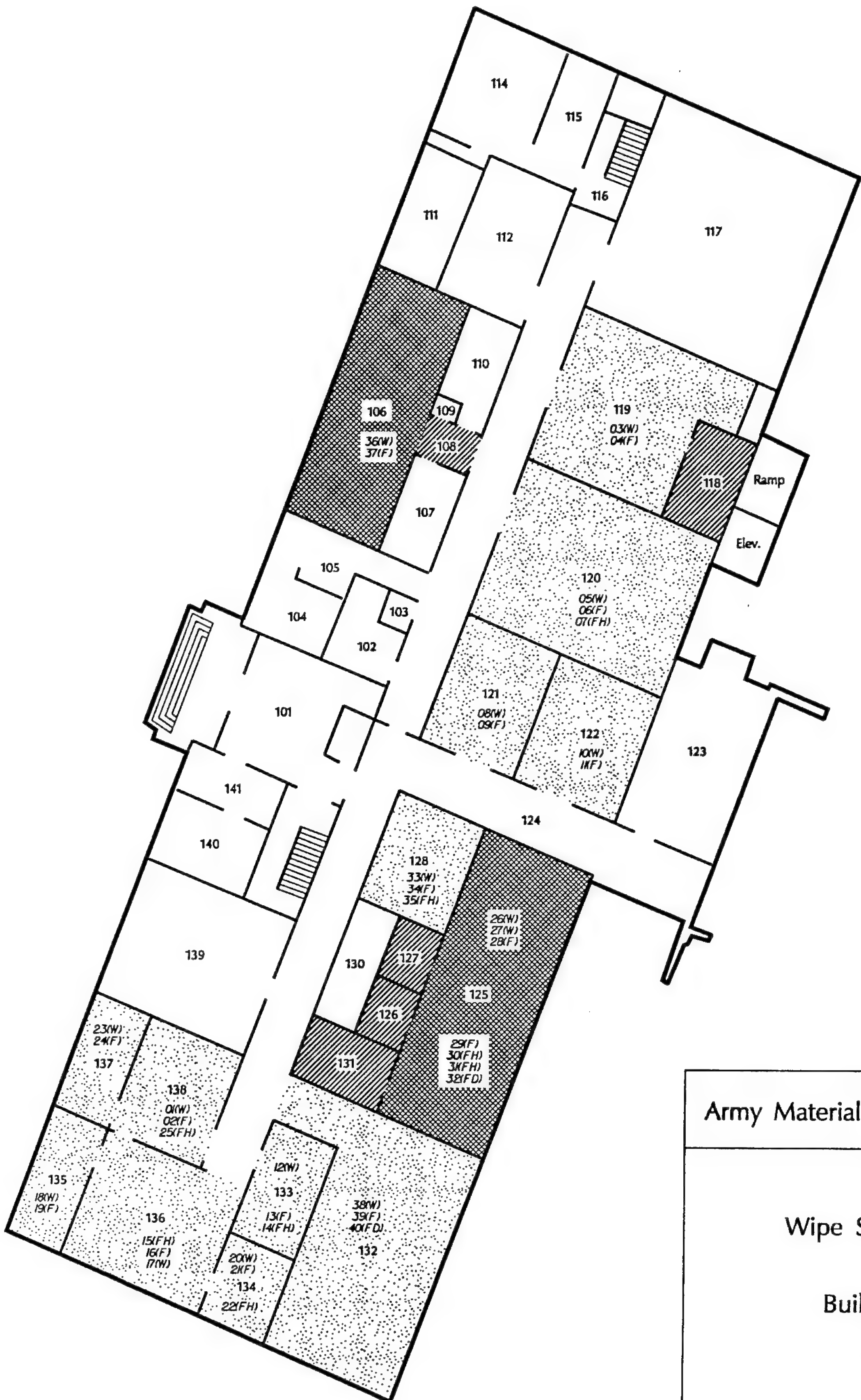
Building No. 243

N

Approximate scale: unknown

Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
FH	Fume Hood
W	Wall Composite
(light stipple)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(dark crosshatch)	Rooms Requiring Remedial Action – Residential Scenario
(diagonal hatch)	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information



Rooms Sampled

106	Laser Lab
119	Magnetics Lab
120	Wet Chemistry Lab
121	Surface Analysis Lab
122	Laser Lab
125	Laser Lab
128	Laboratory
132	Mechanical Room
133	X-Ray Diffraction I.F.H.
134	Laboratory
135	Laboratory
136	Laboratory
137	Office
138	Ionizing Radiation

Army Materials Technology Laboratory

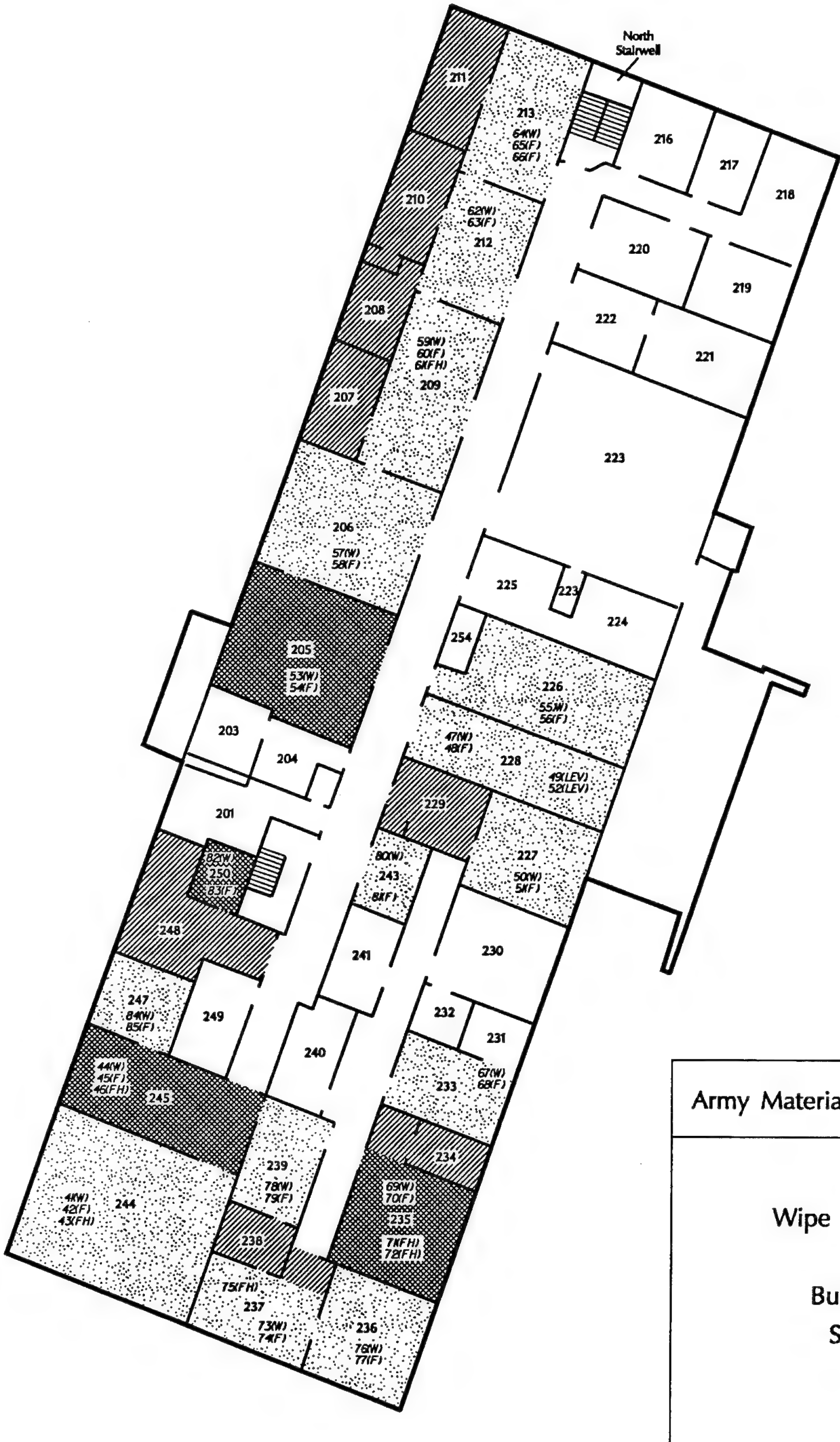
Wipe Sample Locations

Building No. 292

First Floor

N

Approximate scale: 1 in – 25 ft



Legend

109(F)	Sample number and type
F	Floor Composite
FH	Fume Hood
LEV	Local Exhaust Vent
W	Wall Composite
(light stipple)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(dark crosshatch)	Rooms Requiring Remedial Action – Residential Scenario
(diagonal hatch)	Rooms Whose Remedial Status is Yet To Be Determined Pending Additional Information

Note: Room 238 is a photo lab. It's remediation will follow remedial requirements determined for all on-site photo labs

Rooms Sampled

205	X-Ray Diffraction
206	X-Ray
209	X-Ray
212	Laboratory
213	X-Ray
226	Scanning Electron Microscopy
227	Sample Prep. Room
228	Laboratory
231/233	Laboratory
235	Inorganic Chemicals
236	Laboratory
237	Laboratory
243	Former Laboratory
244	Powder Laboratory
245	Laboratory
247	Chemical Laboratory
250	Storage Room

Army Materials Technology Laboratory

Wipe Sample Locations

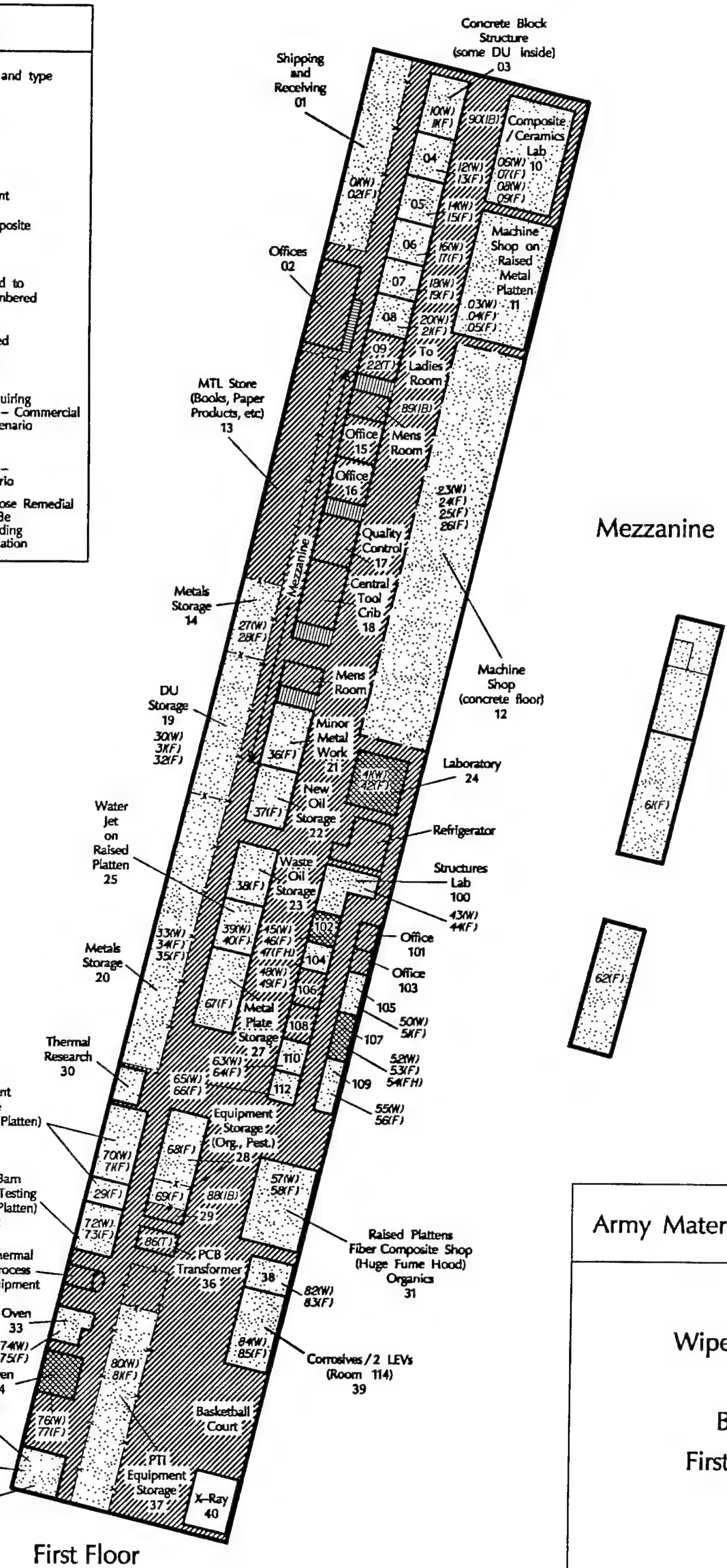
Building No. 292
Second Floor

N

Approximate scale: 1 in – 25 ft

Legend

109(F)	Sample number and type
F	Floor Composite
FH	Fume Hood
IB	I-Beam
LEV	Local Exhaust Vent
T	Transfomer Composite
W	Wall Composite
01–40	Numbers assigned to previously unnumbered rooms
100–114	Already numbered room numbers (pre-fab offices)
(light stipple)	Rooms/Areas Requiring Remedial Action – Commercial or Residential Scenario
(dark crosshatch)	Rooms Requiring Remedial Action – Residential Scenario
(diagonal hatch)	Rooms/Areas Whose Remedial Status Is Yet To Be Determined Pending Additional Information



Areas Sampled

01	Shipping and Receiving
03	DU Storage
04	Machining / Storage
05	Machining / Storage
06	Machining / Storage
07	Machining / Storage
08	Machining / Storage
09	Transformer
10	Composite / Ceramics Lab
11	Machine Shop
12	Machine Shop
14	Metals Storage
18	Machining (2nd Floor) – Machining
19	DU Storage
20	Metals Storage
21	Minor Metal Work (1st Floor) Machining (2nd Floor)
22	New Oil Storage
23	Waste Oil Storage
24	Laboratory
25	Water Jet
26	Equipment Storage
27	Metal Plate Storage
31	Fiber Composite Shop
32	Materials Testing
33	Oven
34	Oven
35	Detonics Laboratory
36	Transformer
37	Equipment Storage
38 / 113	Fiber Winding
39 / 114	Corrosives Lab
100	Structures Laboratory
102	Organic / Metals Laboratory
104	Organic / Metals Laboratory
105	Laboratory
107	Laboratory
109	Laboratory
110	Laboratory
112	Laboratory

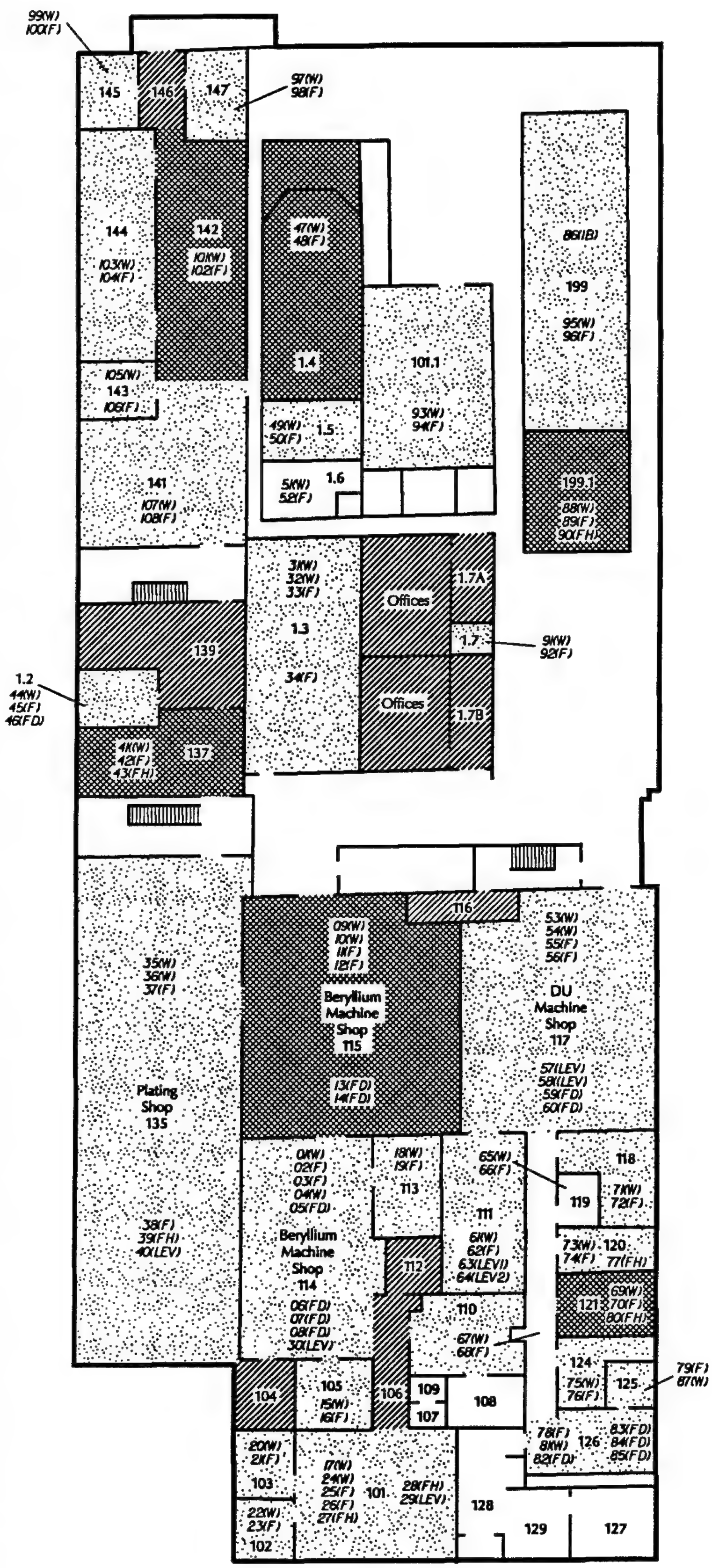
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 311
First Floor, Mezzanine

—Z—

Approximate scale: 1 in – 100 ft



Rooms Sampled

1.2	Salt Bath
1.3	South Test Lab
1.4	Ballistics
1.5	Ballistics
1.6	Ballistics
1.7	Ballistics Storage
101	Testing and Prep.
101.1	Laser
102	Storage
103	Storage
105	Tension / Compression Testing
111	DU Machining
113	Tool Crib
114	BE Machining
115	BE Machining
117	DU Machining
118	Tool Room
119	Laboratory
120	Laboratory
121	Laboratory
122	Laboratory
124	Storage
126	Locker Room
135	Plating Shop
137	Former Laboratory
141	Laser Lab
142	Gas Gun Lab
143	Office
144	Office
145	Compressed Gas / Metal Scraps
147	
199	Ballistics
199.1	Crystal Growth I-Beam Balistics

Legend

109(F)	Sample number and type
F	Floor Composite
FD	Floor Drain
FH	Fume Hood
IB	I-Beam
LEV	Local Exhaust Vent
W	Wall Composite
	Rooms Requiring Remedial Action – Commercial or Residential Scenario
	Rooms Requiring Remedial Action – Residential Scenario
	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

Note: Most of the floors in the southern half of the building have been excavated as part of radiological decommissionning.

Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 312
First Floor

N

Approximate scale: 1 in – 30 ft

Legend

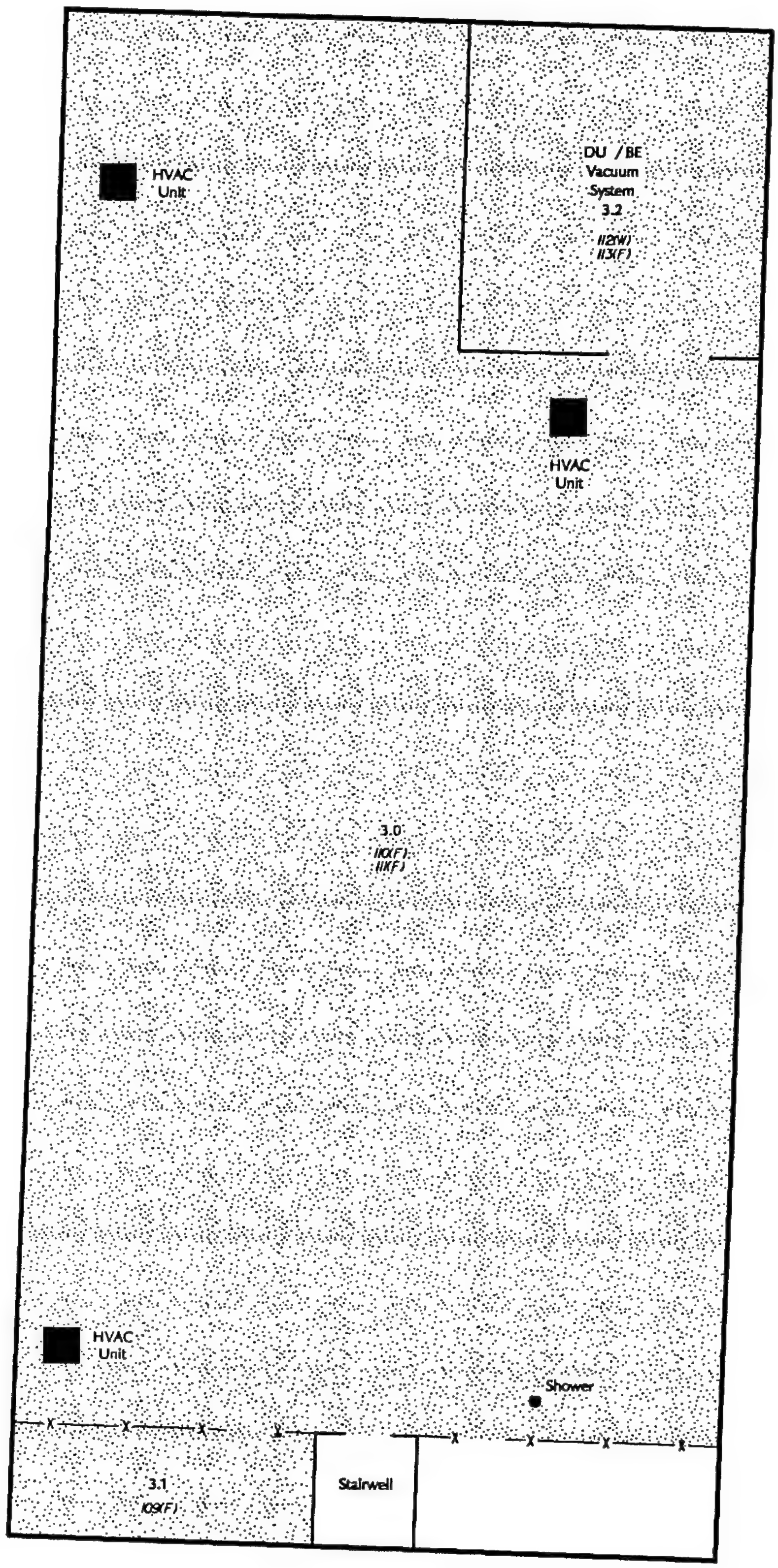
109(F) Sample number and type

F Floor Composite

W Wall Composite

Rooms Requiring Remedial Action – Commercial or Residential Scenario

Note: Sampling of floor for Beryllium is anticipated due to historical problems with the vacuum system.



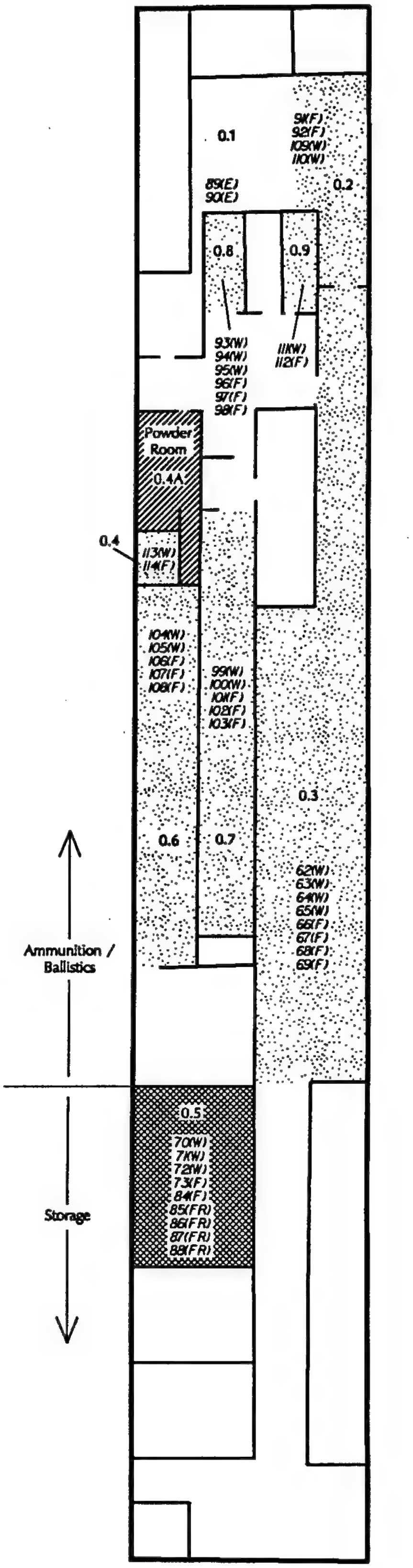
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 312
Third Floor

N

Approximate scale: 1 in – 15 ft



Legend

109(F)	Sample number and type
E	Equipment
F	Floor Composite
FR	Filter
W	Wall Composite
(dotted)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(cross-hatched)	Rooms Requiring Remedial Action – Residential Scenario
(diagonal hatched)	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

Rooms Sampled

0.1	New Air Vent System
0.2	Ammunition Storage
0.3	Metal/Ceramics Storage
0.4	Ammunition Manufacture
0.5	New Air Vent System
0.6	Ballistic Range
0.7	Ballistic Range
0.8	Ballistic Range
0.9	Ballistic Range

Army Materials Technology Laboratory

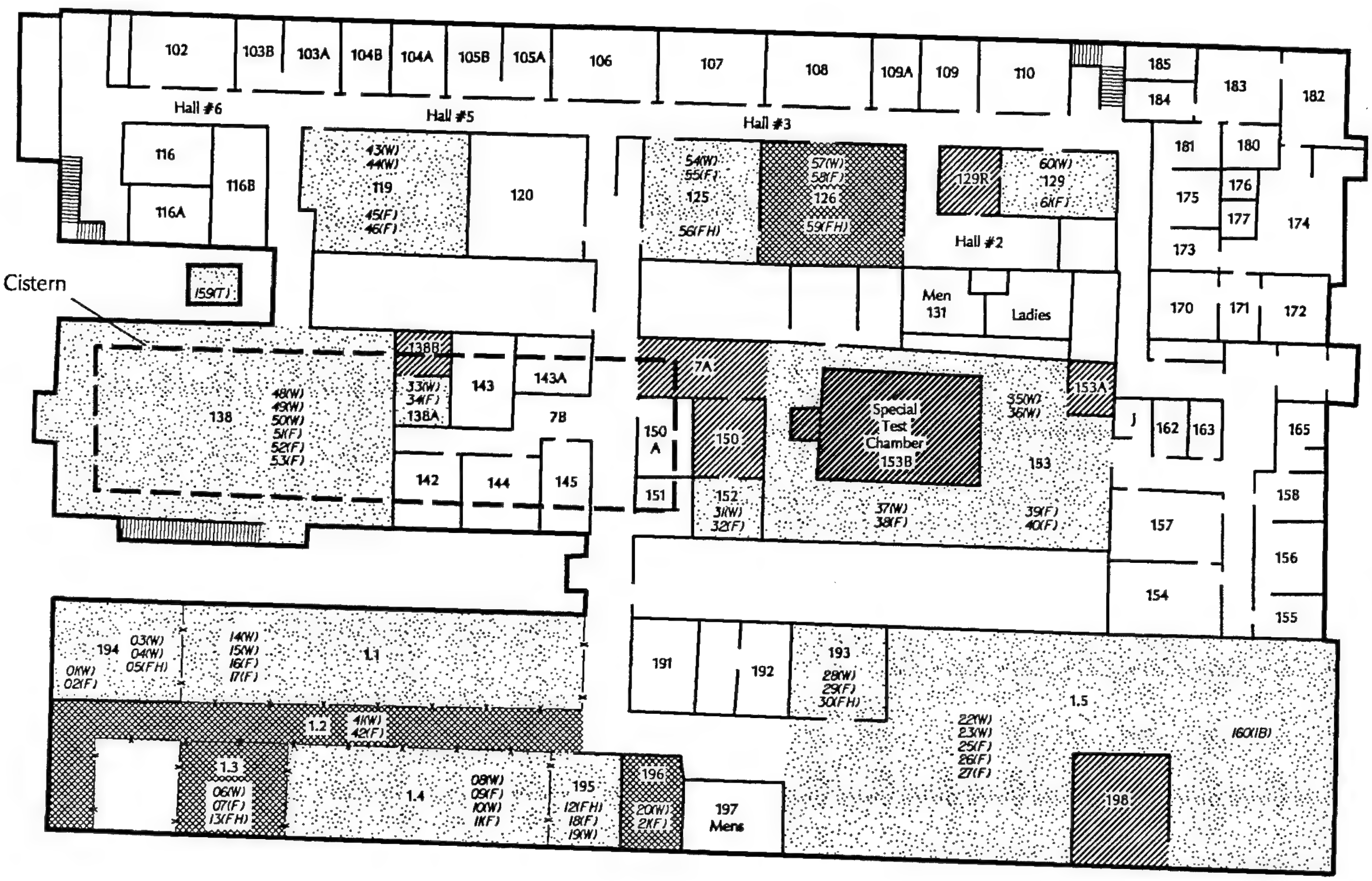
Wipe Sample Locations

Building No. 313

Basement

—Z—

Approximate scale: 1 in – 35 ft



Rooms Sampled

119	Weld Lab Office
125	Ceramics Lab
126	Small Machine Shop
129	Laser Lab
138	Welding
138A	Materials Testing
152	
153	Composites / Metals
193	Laboratory
194	Laboratory
195	Ceramics Research
196	Ceramics Research
1.3	IFH
1.1	(Room East of 194)
1.2	(Between Cage 1 & 3)
1.4	Cage 3
1.5	Water Jet for Cutting Metals
1.5	Metals Foundry

Legend

109(F)	Sample number and type
F	Floor Composite
FH	Fume Hood
IB	I-Beam
T	Transformer Composite
W	Wall Composite
	Rooms Requiring Remedial Action – Commercial or Residential Scenario
	Rooms Requiring Remedial Action – Residential Scenario
	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

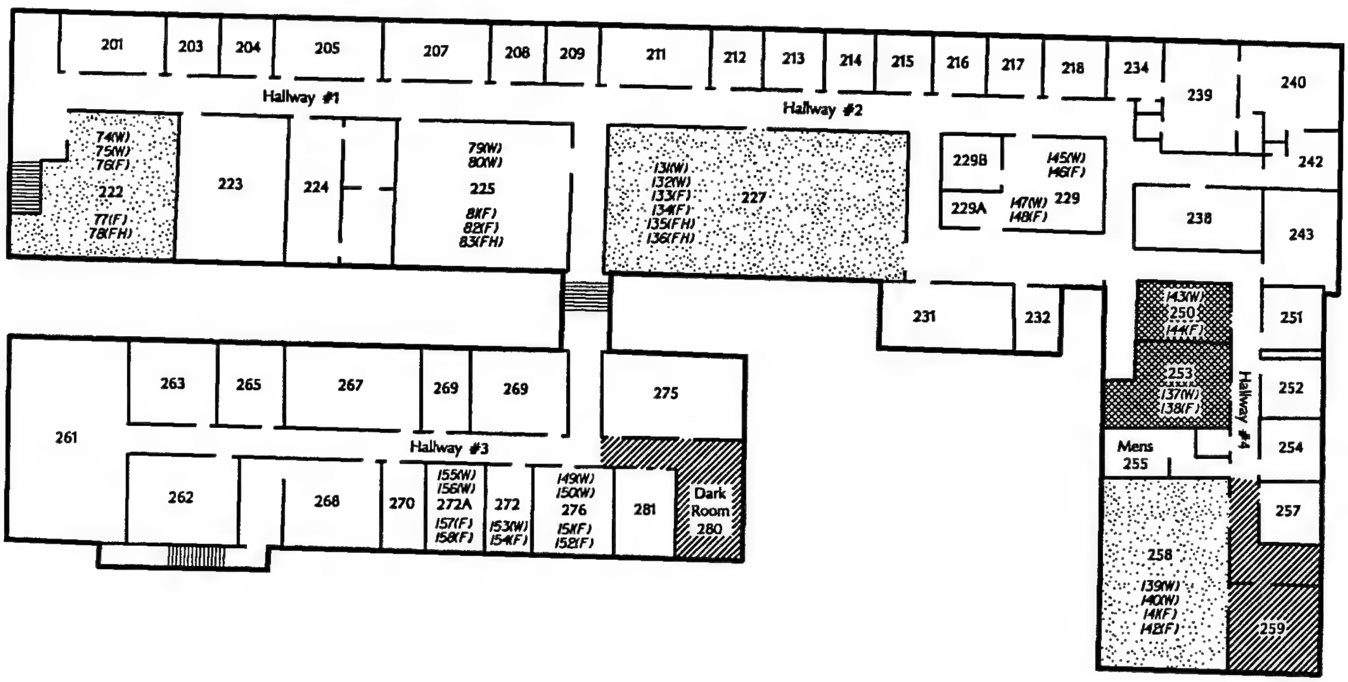
Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 313
First Floor

N

Approximate scale: 1 in – 40 ft



Rooms Sampled

2.1	Toughened Ceramics Lab
225	Ceramic Mechanical Properties Lab
227	Large Lab
229	Electrooptical Materials Lab
229A	Electrooptical Materials Lab
250	Electronics Lab
253	Electronics Lab
258	Ultrasonic Lab
272	2 Level Lab
272A	Laboratory
276	Training Lab

Legend

109(F)	Sample number and type
F	Floor Composite
FH	Fume Hood
W	Wall Composite
(stippled)	Rooms Requiring Remedial Action – Commercial or Residential Scenario
(cross-hatched)	Rooms Requiring Remedial Action – Residential Scenario
(diagonal hatched)	Rooms Whose Remedial Status Is Yet To Be Determined Pending Additional Information

Army Materials Technology Laboratory

Wipe Sample Locations

Building No. 313
Second Floor

N

Approximate scale: 1 in – 40 ft

APPENDIX C

ARARs FOR AIRBORNE CONTAMINANTS

ARARs for Airborne Contaminants

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Volatile Organics					
Acetone	1,780,000	1,800,000	590,000		7,000 (24 hr) 24,000 (30 min)
Benzaldehyde	---	---	---		
Benzene	32,000 proposed: 300	3,000	320		
Bromodichloromethane	---	---	---		
Bromoform	5,200 (skin)	5,000 (skin)	---		
Carbon Disulfide	31,000 (skin)	12,000	3,000	100	
Carbon Tetrachloride	31,000	12,600	12,600 (60-minute ceiling)		
Chlorobenzene	345,000	350,000	---		
Chlorodibromomethane					
Chloroform	49,000	9,780			
2-Chloroethyl Vinyl Ether					
Chloromethane	103,000	105,000	---		
Cyclohexane	1,030,000	1,050,000	---		
1,1-Dichloroethane	810,000	400,000			
1,2-Dichloroethane	40,000	4,000	4,000	700 mg/m^3	2,000 (24 hr) 6,000 (30 minutes)
1,2-Dibromo-3-Chloropropane	---	1 ppb			

ARARs for Airborne Contaminants
(Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
1,1-Dichloroethene	20,000	4,000			
1,2-Dichloroethene	793,000				
1,2-Dichloropropane	347,000	350,000			
cis-1,3-Dichloropropylene					
trans-1,3-Dichloropropylene					
Dioxane	90,000	90,000	3,600 (30-minute ceiling)		
Ethylbenzene	434,000	435,000			
Ethylene Dibromide	A2[g]	(20 ppm)	38		
Ethylene Glycol	127,000[i]	125,000[i]	---		
n-Hexane	176,000	180,000	180,000		
Hexane (other isomers)	1,760,000	1,800,000	180,000		
Methylene Chloride	174,000	1,740,000 (87,000 proposed)	Lowest feasible level		
Methylethyl Ketone	590,000	590,000	590,000		
Methylisobutyl Ketone	205,000	205,000	205,000		
Methyl-n-butyl Ketone	20,000	20,000	4,000		
Methyl Tertiary Butyl Ether					
Pentane	1,770,000	1,800,000	350,000		

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Styrene	213,000	215,000	213,000	70 (30 min) 800 (24 hr)	
1,1,2,2-Tetrachloroethane	6,900 (skin)	7,000 (skin)	Carcinogen - lowest feasible level		
1,1,2-Trichloroethane	55,000	45,000	Carcinogen-minimize exposure		
Tetrachloroethene	339,000	170,000	Carcinogen - minimize exposure	5,000 (24 hr) 8,000 (30 min)	
Tetrahydrofuran	590,000	590,000	---		
Toluene	377,000 proposed: 147,000	375,000	375,000	8,000 (24 hr) 1,000 (30 min)	
Total Trihalomethanes					
1,1,1-Trichloroethane	1,910,000	1,900,000	1,900,000[i]	1,000 (24 hr)	2,000 (annual) 5,000 (24 hr)
Vinyl Acetate	35,000, A2	30,000	15,000[i]		
Vinyl Chloride	13,000	2,600 (carcinogen)	Carcinogen - lowest feasible level		
Total Xylenes	434,000	435,000	434,000		
Semivolatile Organics					
Acenaphthene					
Acenaphthylene					
Anthracene					

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Alpha-Benzene Hexachloride					
Benzo(b)Fluoranthene	(proposed: A2)				
Benzo(k)Fluoranthene					
Benzo(a)Anthracene					
Benzo(g,h,i)perylene					
Benzo(a)pyrene	A2[g]	200	100		
Benzoic Acid					
Benzyl Alcohol					
Benzyl(b)thiopene					
Bis(2-Chloroethoxy) Methane					
Bis(2-Chloroethyl) Ether	29,000	30,000			
Bis(2-Chloroisopropyl) Ether					
4-Bromophenyl Phenyl Ether					
Butylbenzylphthalate					
Carbofuran	100	100	---		
Chloroacetophenone	320	300	---		
Chloroaniline					
Chlorodibromomethane					
4-Chloro-3-Methylphenol					

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Chloronaphthalene					
2-Chlorophenol					
4-Chlorophenyl Phenyl Ether					
Chrysene	A2	200	100 - Carcinogen		
Delta-benzo-hexachloride					
Dibenzo(a,h) anthracene					
Dibenzofuran					
Di-n-Butyl Phthalate	500	500	---		
1,2-Dichlorobenzene	301,000[i] proposed: 150,000[i]	300,000[i]	---		
1,3-Dichlorobenzene	---	---			
1,4-Dichlorobenzene	451,000	450,000 proposed: 60,000	---		
3,3-Dichlorobenzidine	A2[g]				
2,4-Dichlorophenol					
Diethyl Phthalate	5,000	5,000			
Dimethyl Phthalate	5,000	5,000			
2,4-Dimethylphenol					
4,6-Dinitro-2-Methylphenol	200	200			
2,4-Dinitrophenol					

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
2,4-Dinitrotoluene	1,500 (skin) proposed: 150	1,500 (skin)	Carcinogen - reduce exposure to lowest feasible concentration		
2,6-Dinitrotoluene					
Dimethyl Naphthalene					
Di-n-octyl Phthalate					
1,2-Diphenyl Benzene					
Bis-2-Ethylhexyl Phthalate					
Fluoranthene					
Fluorene					
Hexachlorobenzene	proposed: 25, A2				
Hexachlorobiphenyl					
Hexachlorobutadiene	210	240	---		
Hexachlorocyclopentadiene	110	100	---		
Hexachloroethane	proposed: 9,700	10,000	---		
Hexachlorbiphenyl					
Indeno(1,2,3-cd)pyrene					
Isophorone	28,000[i]	23,000	23,000		
2-Methylnaphthalene					
Naphthalene	52,000	50,000	---		

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Pentachlorobiphenyl					
Methylcyclohexane	1,610,000	1,600,000	---		
Methylcyclopentane					
Methylphenol (cresol) - All isomers	2,200	2,200	1,000		100 (24 hrs)
N-Nitroso-Dipropylamine					
N-Nitrosodiphenylamine					
2-Nitroaniline					
3-Nitroaniline					
4-Nitroaniline	3,000	3,000	---		
Nitrobenzene	5,000 (skin)	5,000 (skin)			
2-Nitrophenol					
4-Nitrophenol					
Pentachlorophenol	500	500	---		
Phenanthrene					
Pyrene					
Tetrachlorobiphenyl					
Tetrazine					
1,2,4-Trichlorobenzene	37,000[i]	40,000[i]	---		
Trichlorobiphenyl					

ARARs for Airborne Contaminants
(Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
2,4,5-Trichlorophenol					
2,4,6-Trichlorophenol					
Trimethyl Benzene (All isomers)	123,000	125,000	---		
Trimethylnaphthalene					
Herbicides/Pesticides/PCBs					
Aloclor					
Aldicarb					
Aldrin	250	250	Ca - lowest detectable level		
Atrazine	5,000	5,000	---		
Dieldrin	250	250	Ca - lowest detectable level		
Dinoseb					
Chlordane	500	500	---		100 (24 hr.) 300 (30 min)
Alpha-Chlordane					
Gamma-Chlordane					
4,4'-DDE					
4,4'-DDD					
4,4'-DDT	1,000	1,000	500		

ARARs for Airborne Contaminants
(Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
2-4D	10,000	10,000	---		
2,4,5-TD					
Delta-Benzo-Hexachloride					
Endosulfan	100	100	---		
Endosulfan Sulfate					
Endrin	100	100	---		
Heptachlor and Heptachlor Epoxide	500 proposed: 50, A2	500	---		
Isodrin					
Methoxychlor	10,000	10,000 (total dust) 5,000 (resp. fraction)			
Metolachlor					
Oxamyl					
Endrin Ketone					
Alpha-BHC					
Beta-BHC					
Gamma-BHC (Lindane)	500	500			
Delta-BHC					
PCB-1242 42% chlorine	1,000	1,000	1[h]		
PCB-1254 52% chlorine	500	500	1[h]		

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
PCB-1221 21% chlorine					
PCB-1232 32% chlorine					
PCB-1248 48% chlorine					
PCB-1260 60% chlorine					
PCB-1016					
Toxaphene	500	500	---		
Inorganics					
Aluminum	10,000	15,000 (total dust) 5,000 (resp. fraction)			
Antimony	500	500	500 (skin)		
Arsenic (and soluble compounds, as As)	200	500 (organic compounds) 10 (inorganic compounds)	2[i]		
Barium	500 (soluble compounds as Ba)	500	---		
Beryllium (and compounds, as Be)	2	2	Carcinogen - not to exceed 0.5		0.01
Cadmium	50 proposed: 10 (total dust) 2 (respirable fraction)	200 dust 100 fume	Carcinogen - lowest feasible concentration	0.01-0.02 (annual)	2 (24 hr)
Calcium	2,000	5,000			20-30 (oxide)
Chromium	500 (chromium metal)	1,000 (chromium metal)	25 (chromium metal)		0.0015 (24 hr)
Cobalt	50	50	100		

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Copper	1,000	1,000	---		
Fluoride					
Iron	5,000	10,000			
Lead	150	50	<100	0.5-1 $\mu g/m^3$ (annual)	1.5 $\mu g/m^3$ (24 hr)
Manganese	5,000	1,000			
Magnesium				0.001 $\mu g/m^3$ (annual)	
MBAS					
Mercury (all forms except alkyl vapor)	50	50	50	1 $\mu g/m^3$ (annual)	2 $\mu g/m^3$ (24 hr)
Nickel	1,000 (metal in soluble compounds 100 (soluble compounds, proposed: 50)	1,000 (metal and insoluble compounds 100 (soluble compounds)	15		2 mg/m^3 (annual)
Potassium	---	---	---		
Selenium	200	200	---		
Silver	100 (metal) 100 (soluble compounds)	10 (metal) 100 (soluble compounds)			
Sodium	---	---	---		
Thallium	100 (soluble compounds)	100 (soluble compounds)	---		
Tin (metal)	2,000	2,000			

ARARs for Airborne Contaminants (Continued)

	Occupational Health			Public Health	
	ACGIH TLV-TWA[a] ($\mu g/m^3$)[b]	OSHA PEL-TWA[c] ($\mu g/m^3$)[b]	NIOSH REL-TWA[d] ($\mu g/m^3$)[b]	WHO[e] ($\mu g/m^3$)	ASHRAE[f] ($\mu g/m^3$)
Vanadium, as V_2O_5	50	50	50	1 $\mu g/m^3$ (24 hr)	2 $\mu g/m^3$ (24 hr)
Zinc oxide, dust	10,000 (oxide dust)	10,000 (total dust) 5,000 (respirable dust)			
Cyanide					
Sulfide					
Nitrate					
PM-10 Respirable Particulates	10,000	5,000		50 $\mu g/m^3$ 150 $\mu g/m^3$ (EPA, not WHO or ASHRAE)	

Notes:

[a]ACGIH = American Conference of Governmental Industrial Hygienists. Data from Threshold Limit Values and Biological Exposure Indices, ACGIH, 1991-1992. TLV = Threshold Limit Value. TWA = Time-Weighted Average.
[b]Some references report values for volatile organics in parts per billion (ppb) instead. The ppb designation is valid only for gases and vapors, and is defined as ppb of substance in air by volume. The conversion, based on 1 atm and 25 °C (77 °F), is:

$$\text{TWA in } \mu g/m^3 = \frac{\text{(TWA in ppb) (gram molecular weight of substance)}}{24.45}$$

[c]OSHA = Occupational Safety and Health Administration. Data from 29 CFR Part 1910.1000 (OSHA Standards for Air Contaminants). PEL = Permissible Exposure Level.
[d]NIOSH = National Institute for Occupational Safety and Health. Data from Morbidity and Mortality Weekly Report, 35 (1S), NIOSH, 1986. REL = Recommended Exposure Level.
[e]WHO = World Health Organization. Data from Air Quality Guidelines for Europe, WHO, 1987.
[f]ASHRAE = American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. Data from Ventilation for Acceptable Indoor Air Quality,

ARARs for Airborne Contaminants
(Continued)

ASHRAE Standard 62-1981.

[g]No level given; however, ACGIH classifies the compound as a suspected carcinogen. Levels should be maintained as low as reasonably achievable (ALARA).

[h]ACGIH Documentation of the TLVs and Biological Exposure Indices, 6th Edition, Vol. 1.

[i]Ceiling Limit: Exposure concentration that should not be exceeded during any part of the workday.